12-2009

Prosthetic Configurations: Rethinking Relationships of Bodies, Technologies, and (Dis)Abilities

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PROSTHETIC CONFIGURATIONS: RETHINKING RELATIONSHIPS OF BODIES, TECHNOLOGIES, AND (DIS)ABILITIES

A Dissertation
Presented to
The Graduate School of
Clemson University

In Partial Fulfillment
Of the Requirements for the Degree
Doctor of Philosophy
Rhetorics, Communication, and Information Design

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by
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December 2009

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ABSTRACT

This work rethinks configurations of and relationships between bodies and prosthetics, emerging from a gap between three particular theoretical perspectives. The first perspective builds from Gender and Disability Studies theories; the second operates within the frame of post-humanity and cyborgean theories, specifically though Bernard Stiegler, Katherine Hayles, and Donna Haraway; the third is a practical/medical perspective, demonstrated through the experiences of people with amputations and medical prosthetics, as well as through the influence of medical visualization technologies. While offering productive and compelling means of complicating and deconstructing boundaries of bodies and prosthetics, these perspectives often operate independently; an integrative perspective provides new grounds from which to reconfigure prosthetized bodies.

From these grounds, this work examines social and historical anxieties about body/technology relationships, considering how binary oppositions of "natural" versus "technological" are constructed and discriminatorily employed against people with prosthetics. Through the story of Oscar Pistorius' 2008 Olympic attempt, ideas of norms and norming are contextualized, historicized, and deconstructed. Metaphors of bodies as docile machines are problematized through examination of public representations of women with prosthetics.

This work situates bodies and prosthetics within historical perspectives created through the technological gaze of medical visualization technologies and nuclear medicine; the effects of ubiquitous and participatory communication technologies; the

perception of the body as a malleable technology; and the effects of technologically-advanced prosthetics. Working particularly from the theories of Maurice Merleau-Ponty, Michel Foucault, and Georges Canguilhem, this work posits a new epistemology of the prosthetized body as a historically-situated phenomenological somatechnic.

DEDICATION

To my father, who surrounded me with the wonders of medicine and bodies, encouraged me to always seek knowledge and understanding, and taught me to trust myself.

ACKNOWLEDGMENTS

Many deserve appreciation and recognition for their contributions to and support of this project. First and foremost are my committee members, Steve Katz, Barbara Heifferon, and Christina Nguyen Hung. I am deeply grateful for their expertise, insights, efforts, patience, and flexibility, without which this project would not have been possible.

I'd also like to thank Victor Vitanza, Director of Rhetorics, Communication and Information Design at Clemson University, for his support and encouragement of me within and beyond our program, especially through opportunities for additional study. Through him, and with the support of Clemson's College of Architecture, Arts, and Humanities, I was able to participate in two experiences fundamental in developing my work. First was the 2007 RSA Summer Workshop on Medical Rhetoric, facilitated by Ellen Barton and Sue Wells, to whom I also owe special thanks. Second was a summer semester spent studying at the European Graduate School in Saas Fee, Switzerland. Both of these challenged and broadened my horizons, intellectually, geographically, and personally; the relationships developed with the participating scholars will have impacts throughout my career.

Other personal and academic relationships, particularly with my fellow RCID colleagues, have also been influential. I am especially grateful to the following people. Josh Hilst and Nicole Snell always questioned and encouraged, giving me space to quietly think and actively explore ideas. Josh Abboud spent an unforgettable three weeks braving the physical and intellectual mountains of EGS with me. Diane Perpich first challenged me as a professor, then quickly became an advisor, mentor, and dear friend.

Justin Hodgson and Jason Helms, my two musketeers—I hardly have the words to describe the hours of intellectual sparring, the laughing and crying, the cigars and scotch…and I *always* have words. I quite literally cannot thank them enough.

Much appreciation is also due my family. First, thanks and love to my sisters and brothers (in law), Rachel and Michael Hagenbush, Elizabeth and Tom Robitaille, Rebecca Booher, and Melissa Peck. Among a million other things, they keep me grounded, keep me laughing (often at myself), and always let me know that I am loved. Love and countless thanks as well go to my parents—for the constant, unconditional acceptance of my mom, who loves and supports me even if I do nothing more than exist; and for the unceasingly high expectations of my dad, who loves and supports me enough to push me further, because he knows I'll never be satisfied unless I'm doing my best.

Finally, with the deepest gratitude, I'd like to acknowledge my committee chair, Todd May. His support and guidance have been invaluable, from the day he first called me out in class through the completion of this project. His combination of insightfulness, patience, directness, and humor pushed me beyond what I had even hoped to achieve. He taught me to think deeply, to stay calm, and, when necessary, to just smile and wave. I would not be the scholar that I am without him.

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CHAPTER I

UNPRECEDENTED MATTER

In 2007, Oscar Pistorius, a South African sprinter, was training and competing in preparation for the 2008 Beijing Olympics trials. Having had double transtibial amputations when he was eleven months old, Pistorius runs on technologically advanced prosthetics known as “Cheetah” legs. In January 2008, the International Association of Athletics Federation (IAAF) ruled him ineligible for IAAF competitions (including the Olympics) on the basis that these carbon-fiber blade prosthetics were technical devices that gave him an advantage over other able-bodied sprinters. Pistorius appealed this with the Court of Arbitration for Sport (CAS), which held hearings on the matter, eventually issuing a ruling that revoked the IAAF’s decision. In the text of the arbitration, they note, “The history of this matter is remarkable, and possibly without precedent.”

"Without precedent"—what exactly is new here? Certainly neither amputations, which have occurred throughout human history, nor prosthetics, the development of which dates back to ancient Egypt. Organized sports competitions for disabled athletes are not new: the first Paralympics took place in Rome in 1960, and these were proceeded by competitions dating back to 1948.[1] Prosthetics in the Olympics are not even new: in the 1904 games in St. Louis, MO, George Eyser won six medals in gymnastics—unhindered by his wooden left leg.[2] Despite this history, Pistorius' story stands out, due to both his high-tech prosthetics and his achievements with them, raising controversies over

issues of ethics, fairness, and enhancement.

His is not the only story in the public eye: in the past few years, stories about people with prosthetics—from Iraqi war veterans to young children, from models-as-dancers to athletes-as-models, from those born with bodies that defy norms to those adjusting to bodies changed by unexpected traumas—have proliferated in the media. In *Technologies of the Gendered Body*, Ann Balsamo, considering the appearance of such figures as Max Headroom, the Transformers, and RoboCop, names the 1980s as the "decade of cyborgs," the "historical moment when a high-tech human hybrid moved off the pages of science fiction novels into everyday life" (17). Today, the stories of these people with prosthetics demonstrate another move, from fictional cyborgs to literal embodiments of such "high-tech human hybrid[s]," and their representations in "everyday life" are significant; we might consider this the "decade of the prosthetized body." With these literal embodiments come demonstrations of both public fascination and cultural anxiety about prosthetic bodies, but more importantly about what those bodies challenge: notions of the "normal" or "natural" body; the purpose of prosthetics medically and socially; and the very constitution of the bodies in relation to technologies.

Now, there is considerable precedence for theorizing issues of bodies and prostheses, emerging through numerous perspectives and disciplines throughout history, including (but not limited to) medicine, science, engineering, history, philosophy, art, anthropology, English, disability studies, communication, rhetorics, women's/gender studies, and technocultural studies. Despite this extensive ground, these cultural anxieties persist, suggesting that the CAS was right in its framing of Pistorius' case—there is indeed something unprecedented about these new stories of prosthetics. My project

emerges here, working within a gap that I see between three theoretical perspectives, which I will paint now with a very broad brush, leaving full analysis for later chapters. The first perspective operates within the frame of post-humanity and cyborgean theories, specifically though Bernard Stiegler, Katherine Hayles, and Donna Haraway. While offering productive and compelling means of complicating and deconstructing boundaries of bodies and technologies, considering the future trajectories and implications of such couplings, these theories tend to miss the practical considerations of medically necessary prosthetics. The second perspective, then, is precisely this practical/medical perspective, demonstrated through the experiences of people with amputations and medical prosthetics, and particularly by historian Katherine Ott. While these are clearly crucial positions, giving voice to first-hand experiences, they can fail to consider (or outright reject, in the case of Ott) potentially insightful theoretical and philosophical perspectives. The third perspective is a particular positioning within disability studies that prioritizes "disability" in a way vital for arguments of social inclusion and disability rights, but at times limiting for the experiences of other individuals with prosthetics (specifically Pistorius).

In this project, then, I integrate and interrogate these perspectives in light several contemporary examples, considering the following questions:

What is a "normal" or "natural" body?

What is the relationship of prosthetics to "normal," "fixing," or "enhancing"?

What are the relationships of disability, ability, and superability for prosthetized bodies?

Does a technologized/prosthetized body mean a controlled, docile body?

How can we think about the prosthetized body in a historically-situated frame? This unfolds as follows:

In chapter two, "(Un)Fixing the Body: Oscar Pistorius, Olympic Definitions, and Dis/Super-ability," I return to first fully explicate Pistorius' Olympic case, identifying the potentials and the problems it presents for prosthetized bodies. I then turn to focus specifically on the problematic assumption of a "natural" body as one divorced from technology, and opening the question of the constructions of "normal" and "natural" bodies. While I ground my argument in the work of Georges Canguilhem and Michel Foucault, I also give an overview of how norms operate and are deconstructed by significant gender and disabilities studies' scholars. This work lays the ground to see the construction of "natural" vs. technological body as a myth.

Chapter three, "Docile Bodies, Supercrips, and the Plays of Prosthetics," considers the other celebrations and anxieties of prosthetization by juxtaposing the media representations of Heather Mills, Sarah Reinertsen, and (the fictional) Cherry Darling. Here I query the potential readings of prosthetized bodies as narratives of "supercrips" and of Foucauldian docile, mechanistic bodies, influenced in part by scientific and medical rhetorics. I then problematize these readings through personal narratives of prosthetic experiences, considering the complicated, messy, and constant renegotiations of bodies and technologies.

Having exposed these problematic frames, I turn in chapter four, "Breaking Bounds," to argue for a rethinking of our configurations of bodies and prosthetics. Here, I grapple most extensively with the three theoretical perspectives I suggested above. Working particularly from the theories of (again) Canguilhem and Foucault, and Maurice

Merleau-Ponty's intervolved body-world, and integrating historical perspectives and developing neurological research on phantom limb syndrome, I posit a new epistemology of the prosthetized body as a phenomenological somatechnic. This is historically situated in a four-part scaffolding of a Foucauldian technological gaze created through development of particularly visualization technologies and nuclear medicine (e.g., MRI, CAT scans); the effects of ubiquitous and participatory communication technologies (e.g., Web 2.0); the perception of the body as a malleable technology (the body *as* prosthetic); and the effects of technologically-advanced prosthetics.

I conclude in chapter five, "Prosthetic Configurations," by articulating a new cultural story for this phenomenological somatechnic, and by considering three enactments of this epistemology through reconsidering prosthetic aesthetics of beauty, redefining "disability" as "adaptation" in extreme sports, and changing medical practices of amputation and prosthetization. While these offer potential models for (re)negotiating specific frameworks, they also open up areas for continued future research.

In this work, the examples of people with prosthetics are almost exclusively of lower-limb prosthetics. This specification emerged for two reasons. First, most contemporary media stories of prosthetics are of lower-limb prosthetics. These have had the most dramatic technological developments as they are far easier to construct than, for example, prosthetics for upper limbs, due to the complex actions required of arms and hands. Thus, there are simply more examples of people with amputations having great success with these limbs, and more media coverage of these examples. Second, any productive consideration of bodies and prosthetics must be limited in order provide any detailed insights. As I am committed to importance of historically situated analyses, these

two factors influenced my focus. As there are in any work, such a narrow lens creates certain limitations for my claims, and additional potential limitations including issues of socioeconomic status, access to medical care and insurance, and cultural constraints. However, I see my project offering productive ground from which to begin reconceptualizing our relationships with these emerging prosthetic precedents.

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[1] Sir Ludwig Guttmann organized events for WWII veterans with spinal cord injuries. Additionally, the games weren't called "Paralympics" until 1976; the 1960 games are considered Paralympics in retrospect. See "Paralympic Games" on *Paralympic.org*.

[2] See the stories "Fun Facts: The Olympics Edition," on *npr.org*, and "St. Louis 1904" on *Olympic.org*.

CHAPTER II

(UN)FIXING THE BODY: OSCAR PISTORIUS, OLYMPIC DEFINITIONS, AND DIS/SUPER-ABILITY

"I'm not disabled, I just don't have any legs." –Oscar Pistorius[1]

Blade Runner

Oscar Pistorius was born in Sandton, Johannesburg, South Africa on 22 November 1986 with bilateral fibular hemimelia, a congenital condition that left him without fibulas (shin bones) or ankles, and with only two toes on each foot (Draper). Presentation of this condition varies, as does treatment; depending on the extremity of the condition, bone lengthening and other extensive surgical procedures can be used to preserve much of the body, and restore relative amounts of function to the legs. But in Pistorius' case, "relative" would have been quite limited, potentially still confining him to a wheelchair for the rest of his life. After consulting numerous doctors, his parents made the difficult choice to have his legs amputated between his knees and ankles (McHugh). Amputation occurred when he was eleven months old, and within six months, Pistorius was walking on prosthetic legs. By high school, he had competed in water polo, state tennis, Olympic club wrestling, and rugby (Davies).

He began running in January 2004 as part of a rehabilitation plan from a rugby-incurred knee injury, and quickly garnered great success. In sprinting, he hit his stride (so to speak). In September 2004, he won two medals in the Athens Paralympics—bronze for

the 100m, gold for the 200m. He set the disability sports' world record for the 100m on 4 April 2007 at the Nedbank Championships for the Physically Disabled; the next day, at the same event, he made a personal best time and set the world record for the 200m. He set the world record for the 400m, also winning a gold medal, at the 2008 Beijing Summer Paralympics. Pistorius' success extends beyond the disabled competitive arena as well. He has competed in several able-bodied competitions, earning sixth place in the 2005 South African Open Championships, silver in the 2007 Senior South African National Championships, and achieving a personal best time in the 400m on 16 July 2008 at the Spitzenleichtathletik Meeting in Lucerne, Switzerland ("Oscar Pistorius"). And this is merely the highlight-reel version of his records and medals.

While notable and praise-worthy, Pistorius is certainly not the only athlete with prosthetics to achieve such accomplishments. On their website, Össur, the company that makes his prosthetics, lists Pistorius and twenty-two others as part of Team Össur. This, too, represents only a fraction of similarly accomplished athletes ("Team"). So, why such attention for one man who has (as a quick Google search will reveal) already received a good deal of press? To answer that, we must sift through and probe exactly that coverage. Remarkable are the steps in Pistorius' journey from 2007-2008, when he strove to compete in the Beijing Olympics (not only the Paralympics). Within that journey, and the corresponding press, commentaries, and hearings, we can see the roots of a much larger issue—a questioning of the very constitution of bodies in relation to technologies. In this chapter, I will explore Pistorius' experience as a case study of changing norms and bodies, from the IAAF decision that excluded him from competition, through his appeal and the trial that over-turned that decision.

To Run or Not To Run

To understand the situation at hand, we must begin with the International Association of Athletics Foundation (IAAF). This organization began in 1912 as a governing body for sports, for "standardiz[ing] technical equipment and world records" ("History"). As interest and participation in sports increased, so did the purview of the organization, which notes the impact of "the development of applied sports sciences, improved equipment and new training and competition techniques," particularly in the past ten years. Along side this, they cite the increased use of performance enhancing drugs as an unfortunate co-development to which they have responded with vigilant anti-doping programs. Their governance, specified in the *IAAF Competition Rules 2008*, extends over numerous international sporting events (also specified in the *Rules*), including the Olympics.[2] IAAF President Lamine Diack sees the influence of the organization stretching beyond that of athletes and fans, and asserts that "our efforts will benefit millions of youngsters around the world and encourage them to live healthier lives and compete in a true spirit of fair play and equality." Thus the early concept of "standardization" can also be read as "fairness," with the IAAF's mission as an attempt to create and enforce an equal playing field for athletes.[3]

In 2004, Pistorius began competing in South Africa in able-bodied events sanctioned by the IAAF—in other words, he was an eligible athlete for IAAF competitions, including the then forthcoming Beijing Olympics. With success in these events, Pistorius received invitations to participate in other international able-bodied competitions. However, this development soon came under scrutiny. On 26 March 2007,

the IAAF Council introduced a new amendment "e" to IAAF Rule 144.2.[4] Titled "*Giving Assistance*," the rule notes what will *not* be considered assistance (i.e., something that would give unfair advantage), specifying two conditions; following this, it states, "For the purpose of this Rule the following shall be considered assistance, and are therefore not allowed." Amendment "e" reads as follows, prohibiting:

> use of any technical device that incorporates springs, wheels or any other element that provides the user with an advantage over another athlete not using such a device. (100)

This extraordinarily vague statement (which I will address in a moment) was used almost immediately to challenge Pistorius' eligibility.[5] With his willing participation, the IAAF embarked on an examination of Pistorius' performance that July, beginning with an analysis of a videotape of him running the 100m in the Golden Gala event in Rome. Results of this analysis proved inconclusive; while Pistorius was faster than able-bodied runners in the end of the race, he was slower off the starting blocks and during early acceleration; thus, no clear advantage could be determined.

The IAAF deemed further investigation necessary and commissioned a biomechanical study performed by Professor Peter Brüggemann at the Institute of Biomechanics and Orthopaedics at the German Sport University in Cologne. Pistorius agreed to further testing in November 2007, after protocol was established between the IAAF and Prof. Brüggemann. The following month, Prof. Brüggemann and colleagues issued the Cologne Report, stating the following in their conclusion:

> In total the double transtibial amputee received significant biomechanical advantages by the prosthesis in comparison to sprinting with natural

> human legs. The hypothesis that the prostheses lead to biomechanical disadvantages was rejected. Finally it was shown that fast running with the dedicated Cheetah prosthesis is a different kind of locomotion than sprinting with natural human legs.[6]

Based on these findings of "significant biomechanical advantages," on 14 January 2008, the IAAF issued a press release with the following pronouncements. They determined that an athlete with a Cheetah leg consumes less energy than an able-bodied athlete running at the same speed. They claimed that Cheetahs create a stride with less vertical motion (resulting in less energy expended) and lose less energy than the human ankle in maximum sprinting. Thus, they ruled that Cheetahs offer a "demonstrable mechanical advantage" and should be "considered as technical aids in clear contravention of IAAF rule 144.2"("Oscar Pistorius – Independent").

With this, Pistorius was ruled ineligible from IAAF-sanctioned able-bodied competitions. This ruling attempted to create a clear line in the sporting sand, placing "natural" bodies on one side, technologically-enhanced bodies on the other. But another line became instantly muddled. The prior significant distinction in sports that Pistorius challenged had lain between abled and disabled bodies, with the purpose of creating an equal playing field for disabled athletes, as abled athletes would have clear advantages. Ruling Pistorius ineligible on these conditions immediately created a problematic dual construction: Pistorius as both *dis*-abled and *super*-abled. This is a curious position, rhetorically and practically: because of his amputation, his perceived *lack* (both literally and in presumed ability), his body is labeled "disabled;" because of his prosthetics, he is perceived to have circumvented "abled," moving directly to "advantaged." Pistorius

himself eschews both labels, as is demonstrated in the epigraph to this chapter; in that same interview, he elaborated:

> Anyway, what is disabled? Some people view themselves as disabled because they have one or two disabilities. But what about the millions and millions of abilities they have? So what if you have a leg or two missing? OK, you might not be able to run and jump but there are so many other things you can do. (Philip)

Having never walked on "natural" legs, his prosthetic experience *is* his experience of his body, of locomotion. As such, his experience conflicts with the constructions of his body socially and by the IAAF. These external constructions see him and his prosthetics only through prefixes to "abled," insisting on his differences and placing him within hierarchies of ability. However, for Pistorius, he—his body and prosthetics—is "natural," or more specifically "normal." With that frame, as well as evidence that results of the Cologne Report were incorrect, Pistorius filed an appeal with the Court of Arbitration for Sport on 13 February 2008.

"…just one of the challenges of 21st Century life"[7]

The CAS held hearings on Pistorius' case in the spring of 2008, the details of which are recorded in the Arbitral Award 2008/A/1480. Two particular questions emerge as the basis for appeal:

> "Was the process leading to the IAAF Decision procedurally unsound?"
>
> "Was the IAAF Decision wrong in determining that Mr. Pistorius' use of the *Cheetah Flex-Foot* device contravenes Rule 144.2(e)?"[8]

On matters of procedure, the CAS determined that the IAAF process "fell short of the high standards" expected of such an organization, though this shortcoming did not directly affect the process of appeal; this would be addressed by the other question (12). However, the panel did confirm one interesting supposition, considering it "likely that the new Rule [144.2(e)] was introduced with Mr. Pistorius in mind" (10). This suggests a broad, underlying anxiety—that the rule was not merely in response to changes in sport, but created for the purpose of excluding Pistorius on the basis of his preconceived advantage, prior to any study of the issue. Though Pistorius' achievements were notable, his racing times were not significantly different from other racers of his caliber. This rule and subsequent examination seems, then, to have been based on his appearance (literally seeing a man with clearly prosthetic legs) and the perception that such technology *must* give unnatural advantage.

The Panel's consideration of the second question, directly addressing rule 144.2(e), reveals two significant issues of rhetoric and evidence. First, they impressively critique the problematic language of the rule, noting, "Without implying any criticism of the draftsman, who faced an extraordinarily difficult task, the Panel considers that this provision is a masterpiece of ambiguity" (13). For clarity, I will again cite the text of the rule, which forbids "use of any technical device that incorporates springs, wheels or any other element that provides the user with an advantage over another athlete not using such a device." Though the Panel tentatively concedes that the Cheetah foot could be considered a "technical device," they challenge the vagueness of the phrases "incorporates springs" and "advantage…over another athlete." The following extended quote shows their objections at the level of definition:

> What constitutes a device that *incorporates springs*? Technically, almost every non-brittle material object is a "spring" in the sense that it has elasticity. Certainly the *Cheetah Flex-Foot* is a "spring," but does it *incorporate* a "spring"? A natural human leg is itself a "spring."
>
> […] It was urged on the Panel by the IAAF's counsel that the ordinary and natural meaning of the word *advantage* is absolute, in the sense that if a *technical device* is used, and is determined (presumably by an appropriate and fair process) to provide an athlete with any *advantage*, however small, in any part of a competition, that device must render that athlete ineligible to compete regardless of any compensating disadvantages.

The Panel unfolds the assumptions packed into seemingly innocuous, absolute terms, in turn complicating, or revealing the complicated nature of, the relationship between "technical devices" and bodies. They conceded that some devices, such as motors or pogo sticks, would undoubtedly confer advantages to a user; however, many "devices" fall into the space between, including, here, a natural leg (also a "spring") and a wheel. As Pistorius makes slippery the presumed grounds of disability, ability, and superability, so too the unstable grounds of "advantage" and "technical device" are revealed. The panel notes the IAAF's insistence on the "ordinary and natural" meaning of "*advantage*," but this meaning is tied directly to that of "*technical device*." The course of this investigation suggests that all of these terms (including the descriptors of "ability") seem to be reliant on presumably "natural" and clear meanings; they are instead revealed as

constructions dependent on undefined assumptions about presences and absences of flesh and technologies.

The Panel then turns to evidentiary issues. They return to "advantage," here expanding it to "overall net advantage." The scientific teams for both sides confirmed the Cologne report results, and Pistorius' experts submitted additional reports on metabolic expenditure in the "Houston Report." It was determined that the Cologne study, under strict direction from the IAAF, looked only "for advantages, not for disadvantages" in quantifying Pistorius' performance, resulting in outcomes that did not consider the full metabolic and biomechanical experience of running with the Cheetah prosthetics—in other words, they could not determine an "overall net advantage" (15). Additionally, upon further discussion, the experts agreed that the issues of vertical motion and energy potentially lost by the ankle are not fully understood. In light of this, the Panel notes that "based on current scientific knowledge, it appears to be impracticable to assess definitively whether the *Cheetah Flex-Foot* prosthesis acts as more than, or less than, the human ankle and lower leg" (16).

With this, Pistorius wins his appeal.

On 16 May 2008, the CAS revokes the IAAF decision of 14 January, and Pistorius again becomes eligible to complete in IAAF-sanctioned events—specifically the Beijing Olympics. The decision comes with strict emphasis that the ruling applies only to Pistorius, and only in regards to the specific model of prosthesis examined. In the end, Pistorius did not actually qualify for the South African Olympic team, reinforcing in practice that he wielded no significant advantage with his blades. Regardless, the significance of the case still resonates. Despite being targeted for exclusion by the IAAF,

being made both dis- and super-abled, Pistorius persevered, arguing for and earning the opportunity to compete, and opening the door for further considerations of prosthetics and athletic.

However, this happy ending does not complete the story. Notwithstanding the positive and thoughtful results of the CAS Arbitration, an underlying problem remains. Though the CAS overturned the IAAF's initial decision, they did so within the same frame—the problematic concept of a normal body. While the Panel questioned the rhetorical constructions at play in terms like "springs" and "advantage," they neglected a more powerful controlling term—normal. They determined Pistorius' eligibility because he fit (or did not *not* fit) within a discreet formula of "human" and "able," based on his biomechanical output in comparison to five "control" athletes—athletes who were not amputees, and did not use the Cheetah prosthetic. Thus, this technology is allowed only because it does not interrupt, disturb, or displace this "normal" standard. But why is this problematic? Here, we must examine the creation of norms, the norming of the body, and the subtle slips that turn "normal" to "natural," or, more specifically, "naturally correct."

Norms

Norms have been historically considered and critiqued across disciplines; here, I'll look at the intersection and overlapping of norms as addressed through gender studies, focusing next more specifically on the work of Michel Foucault, and finally seeing how disability studies takes up this term. This is not a solely historical, chronological review, but rather one that tracks fields and persons of influence on my project. The meaning of the term "norm," however, shifts throughout these theorists, sometimes being used

interchangeably with "normal," often considered with significant negative connotation. I want to begin, then, by defining "norm" as I intend to use it, and for this, I will first turn to a discussion of "normal" by Georges Canguilhem.

Canguilhem

Georges Canguilhem's work, specifically *The Normal and the Pathological*, significantly influenced numerous French philosophers of the mid-twentieth century, including Foucault (who writes the introduction to his work).[9] A medical doctor and philosopher, Canguilhem explores the meaning and construction of "normal" in biology and medicine, working in two significant and interrelated ways. On one hand, "normal" operates as a statistical representation of an average or standard. It is descriptive, reflecting an accounting of characteristics (blood pressure, heart rate, height). On the other hand (though also holding the first), "normal" is normative, defined by Canguilhem as "every judgment which evaluates or qualifies a fact in relation to a norm, but this mode of judgment is essentially subordinate to that which establishes norms. Normative, in the fullest sense of the word, is that which establishes norms" (126-127). Normal, then, entwines both an identification and a process of shaping evident in biology and medicine, particularly in the treatment of disease (and its pathology).

Canguilhem continues by then exposing the malleability of "normal." He writes:

> Taken separately, the living being and his environment are not normal: it is their relationship that makes them such. For any given form of life the environment is normal to the extent that it allows it fertility and a corresponding variety of forms such that, should changes in the

> environment occur, life will be able to find the solution to the problem of adaptation—which it has been brutally forced to resolve—in one of these forms. […] There is no fact which is normal or pathological in itself. An anomaly or a mutation is not in itself pathological. These two express other possible norms of life. If these norms are inferior to specific earlier norms in terms of stability, fecundity, variability of life, they will be called pathological. If these norms in the same environment should turn out to be equivalent, or in another environment, superior, they will be called normal. Their normality will come to them from their normativity. The pathological is not the absence of a biological norm: it is another norm but one which is, comparatively speaking, pushed aside by life. (143-44)

Canguilhem argues that constructions of normal do not exist as absolutes, in a vacuum—they cannot be segregated from their conditions or environments, and changes in these factors change our per- and conceptions of normal.[10] Here, we see the roots of Foucault, who traces the effects of power in this equation.

This analysis of biological/medical conceptions of normal grounds my use of the terms "norm" and "normal." Two aspects resonate particularly well: 1) that of norms as a process of identification; and 2) that of norms as malleable. In and of themselves, I see norms not as problematic judgments, but as often-useful means of measurement and comparison. Thus, comparing Pistorius to a norm in order to determine whether or not he had an advantage is not in and of itself problematic. It can even be seen as necessary in the face of competition, where an underlying equality of competitors is needed in order to determine who is the best. I am not looking, then, to eliminate the very concept of

"normal." The problem instead lies, once again, in two places: 1) how that norm is established; and 2) if/when "normal" shifts to a claim of "natural." The first can be addressed by seeing norms as malleable, subject to interpretation based on variables such as individuals, environments, and adaptations. The second involves a few moves.

The first move to shifting the meaning of "normal" attaches value judgments to the realm of the "normal." Instead of a simple comparative, that which is determined to be "normal" becomes that which is correct, right, good; that which is not "normal" is then, by default and design, bad, abject. The next move further ascribes the weight of this "good" judgment by erasing the underlying constructions, the aforementioned design, of "normal;" in other words, this removes any sense of malleability and interpretability, replacing these with an ahistoricism quite difficult to combat. Of course, this is not only ahistorical, but also arhetorical, aphilosophical, acultural, aideological—or, in a broader view, removed from contextualization (for simplicity, though, I'll continue to use "ahistorical"). Without context or history, the term hovers as an absolute cipher, removed from any ground from which it might be challenged. Thus From here, a designation of "normal" can then be employed as one of "natural," or, more precisely, as "naturally correct." Instead of "normal" operating pragmatically, this conflation makes "normal" problematically value-laden, judgmental, and seemingly absolute. Once these moves have been engaged (a process difficult to trace, as it inherently works to erase itself), "normal" can wield great social and political power. Feminist critiques of norms begin to expose this seemingly imperceptible process. I have moved a bit away from discussing the problem of technology here, but want first to consider other constructions.

Gender

Feminist analysis is often credited with the nascency of studies of norms and the body. Feminists exposed the male body as an unstated standard (that which is naturally correct) against which women have been held, and with which women have been discriminated against (an example of the employment of aforementioned political power). Here, I will first lay the ground by walk through a number of influential theorists and ideas, then begin drawing connections to my greater questions.

In *The Second Sex*, Simone de Beauvoir attempts to write about women; responding to an already established history of such studies, she realizes that she must first ask, "What is a woman?" (xiii). Struggling to answer this outside of biological determinism and cultural expectations, she comes to articulate that against which woman is implicitly compared: man. She writes:

> In actuality the relation of the two sexes is not quite like that of two electrical poles, for man represents both the positive and the neutral, as is indicated by the common use of *man* to designate human beings in general; whereas women represents only the negative, defined by limiting criteria, without reciprocity. (xv)

De Beauvoir identifies man as the implicit standard, "both the positive and the neutral," deconstructing the dichotomy of the pair man/woman and refiguring it as man/not-man. Pulling from Aristotle, St. Thomas, Levinas, and Levi Strauss (among others), she draws our attention to a history in which man need never define himself—he and his body are objectivity, normalcy, the Absolute, the One; thus women are subjective, non-normative, the lack, the Other.[11]

Luce Irigaray works from similar ground, notably in "This Sex Which Is Not One," which begins by exploring women's physicality and sexuality. She claims that "[f]emale sexuality has always been theorized within masculine parameters," critiquing the analyses and explanations of women's sexuality by Freud and others as "prescribed more by the practice of masculine sexuality than by anything else" (1467). Thus again, man is the unstated norm by which woman is defined. Irigaray up-ends this by exploring what she sees as woman's fundamental difference from man in anatomy, sexuality, and essence. This is the play of her title—woman is not singular, but multiple: "*She is neither one nor two*.…And her sex organ, which is not *a* sex organ, is counted as *no* sex organ. It is the negative, the opposite, the reverse, the counterpart…" (1468). Woman is culturally negated by her vagina as "it" (and thus she) is not singular like the penis (and thus he). Irigaray instead identifies women's sexuality as multiple, found in the touching of two lips/labia and the diversified "geography of her pleasure;" this multiplicity extends then to her essence, her ways of knowing, feeling, communicating. Even at the level of language women are here excluded, as linearity and phallogocentrism mark language and logic in the domain of man.[12]

This notion of exclusion appears more strongly in Julia Kristeva's work through the concept of the abject. Building from Mary Douglas' *Purity and Danger*, Kristeva, in *Powers of Horror*, explains that the abject, "the jettisoned object, is racially excluded and draws me toward the place where meaning collapses;" it is that which "disturbs identity, system, order" (2, 4). A first focus of abjection is the mother; associated with the physical, the animal, the polluted, existing outside the symbolic realm of the phallus, the mother must be made abject by the child for the child to create his own autonomous self.

Here, woman/mother is further removed, linguistically, rhetorically, subjectively, from the dominant norm of man. Through Irigaray and Kristeva, we begin to see the relationship of language in the construction of norms.

Essentialists feminists (such as Irigaray) offer important and productive perspectives on gender; they also rely on absolute differences between men and women, usually rooted in the physical body—i.e., women are, *a priori*, essentially different from men because they *are* (physically, biologically, fundamentally) women. This reliance on physicality becomes problematic as it reinforces ideas of a "natural" body *a priori* of culture or language; while cultural and language come to bear in the expression of "femaleness," these (seemingly) emerge from a biologically absolute "woman." Thus, I find these perspectives problematic as, while they undermine the norm of "man," they reinforce norms of two distinct sexes.[13] Critiquing the role of language in the construction of norms allows a move away from essentialist feminism, allowing for the female body not to be inherently imbued with characteristics that make it inferior to, or simply different from, that of the male body. Instead, bodies—female and, it then stands to reason, male—can be seen as constructed through language, culture, and (in Foucault's terms) practice. This recognition of the constructed body then begins to destabilize norms of sex as well as of "natural" bodies.

Judith Butler extends claims about the constitution of bodies through discursive means, employing the work of (among others) Kristeva, Foucault, and Derrida. She writes, "one is one's gender to the extent that one is not the other gender. A formulation that presupposes and enforces the restriction of gender within that binary pair" (Gender 30). Expanding on de Beauvoir, Butler sees gender operating in the negative in both

directions: to be a woman is to be *not* a man, and also, to be a man is to be *not* a woman For Butler, sex/gender is not prediscursive but always already constructed by language and expectations of sex/gender. Working against these limited binaries, Butler argues for sex/gender as performative: a verb—an action, an active construction; rather than a noun—a name inscribed on someone, something that "is." The performance of gender for Butler then works similarly to Derrida's performative language, in a system in which gender both cites a norm and recreates and reestablishes that norm. She writes:

> To claim that discourse is formative is not to claim that it originates, causes, or exhaustively composes that which it concedes; rather, it is to claim that there is no reference to a pure body which is not at the same time a further formation of that body. (Bodies 10)

Butler postulates that genders, and bodies at large, are never "purely" accessible, but are always already shaped by discourse as well as practice.[14] Her model of gender performance specifically through drag, something that destabilizes that which it emulates, demonstrates this construction, again calling attention to and destabilizing these norms. Elizabeth Grosz extends Butler's claims, reflecting these conceptual constructions in *Volatile Bodies*, where she writes:

> …the body, or rather, bodies, cannot be adequately understood as ahistorical, precultural, or natural objects in any simple way; they are not only inscribed, marked, engraved, by social pressures external to them but are the products, the direct effects, of the very social constitution of nature itself. (x)

Here again, bodies are not inherently determined by their physicality, but created by and understood through these other inscriptions. She later echoes de Beauvoir in addressing sexually specific bodies, seeing the "enigma that Woman has posed for men" as one which can exist only when men inherently assume a subjective, norming position. Grosz writes, "But if one takes seriously the problematic of sexual difference, then as mysterious as Woman must be for men, so too must men be for women (and indeed so too must Woman be for women, and Man for men)" (191). Grosz articulates a more extensive un-norming of both gender and sexuality, revealing the categories of Woman and Man to be precisely that—"products…of the very social constitution of nature itself" to be queried mutually across and within those categories.

My last example here departs from theories of construction, or at least those alone, working instead biologically. Anne Fausto-Sterling, in *Sexing the Body* and *Myths of Gender*, explores medical/biological constructions and presumptions that both create and result from beliefs in distinctly dichotomous sexed bodies. She debunks sex-based scientific findings about such issues as intelligence, hormones/emotions, embryological development, and anatomy by first debunking the myth of culturally detached research: "In analyzing the male/female differences these scientists peer through the prism of everyday culture, using the colors so separated to highlight their questions, design their experiments, and interpret their results" (Myths 9). Of course, Fausto-Sterling is a biologist, not a rhetorician; while she does not frame her critique as one of language, there are certainly rhetorical resonances. Fausto-Sterling's prism could also be described as what Kenneth Burke calls terministic screens—inescapable lenses, constituted by terminology, which shape how we see the world.[15] Thus, if studying sex-based

differences through the lens of sex-based differences, it is likely that one will find sex-based differences. Fausto-Sterling interestingly suggests that she is not victim to this prism, claiming instead that she "examine[s] mainstream scientific investigations of gender by looking closely at them through the eyes of a scientist who is also a feminist," which allows her to "see things about the research methods and interpretations that many others have missed" (Myths 11). This is potentially just splitting hairs; she is certainly subject to a prism, but by defining it ("a scientist who is also a feminist") she resists becoming an unknowing victim. Regardless, she does reveal problems in and suggest different interpretations to these earlier studies.

Perhaps most significant are her revelations about intersexuality. Resulting from a variety of scenarios (genetic, hormonal, idiopathic), intersex bodies have, to varying degrees, ambiguous genitalia, neither definitively male nor female. Fausto-Sterling claims that intersex babies comprise nearly 1.7% of all births; responding to this in light of binary sex, she writes, "A body's sex is simply too complex. There is no either/or. Rather, there are shades of difference" (Sexing 51-53, 3). This declaration overturns the standard accepted biological norms of male/female sexual anatomy.

Though an extremely brief overview of only some important considerations, this review establishes three crucial moves in feminist deconstructions of sex/gender norms in body construction:

1) the initial recognition of "male" as an unstated norm in relation to women and bodies;
2) the roles of discourse and practice in establishing norms of gender and bodies;
3) the deconstruction of a certain traditional view of objectivity, revealing the

influence of discourse and practice on medicine and science (fields often seen to simply reveal "natural" truths).[16]

Valuable in and of themselves, these feminist critiques also create theoretical space for similar critiques based on race, sexuality, or, as I will address shortly, (dis)ability. Throughout, we see the deconstruction of the "normal" and the "natural," here primarily operating as normative. Gender studies deconstructs long-held beliefs and structures of gender/sex (rhetorical, social, and biological) revealing them to be in fact assumptions and constructions. This then gives not only historical ground for my own deconstructions of "normal" in the relationships of bodies and technologies, but a comparative frame from which to work. They also, particularly in the work of Butler and Grosz, interact substantially with the work of Michel Foucault, which in itself serves as a touchstone for social/medical/cultural critiques.

Foucault

According to Michel Foucault, historical practices created docile, bodies, and, relatedly, particular constructions of bodily and behavioral norms. Foucault explores this in *Discipline and Punish* by tracing a shift from juridical to modern power, interrogating how this (bio)power and power/knowledge discipline the body and shape the modern soul. In the first volume of *History of Sexuality*, Foucault queries sexuality and biopower, through anatomo- and bio-politics, as constructive of our (sexual) identities.

Through *Discipline and Punish*, Foucault examines the practices of discipline, as employed in prisons, schools, and hospitals in the seventeenth to eighteenth centuries, that created "docile bodies," bodies "that may be subjected, used, transformed and

improved" (136) .[17] Foucault attributes this creation to a new pattern of power that emerges along side the rise of capital and ownership of property. Prior conceptions of power, juridical power, operated from the top down: the king would impose his power and will upon his subjects who were either right or wrong—on one side of the fence, or another. If one was wrong, then severe punishment could be meted out, particularly upon one's body, further demonstrating the authority of the king even over the flesh of his subjects. Modern power, on the other hand, works from the bottom up, created within relationships and interactions. Within this structure, and an economic change in the distribution of wealth, comes the rise of the prisons and a need for control.[18] This control was established through the discipline of the body with the effect of creating useful individuals, "subjected and practiced bodies, 'docile bodies'" (138).

It is within this "transformed and improved" where normalcy begins to be seen. Foucault writes that this disciplinary power "brings five quite distinct operations into play:"

> …it refers individual actions to a whole that is at once a field of comparison, a space of differentiation and the principle of a rule to be followed. It differentiates individuals from one another, in terms of the following overall rule: that the rule be made to function as a minimal threshold, as an average to be respected or as an optimum towards which one must move. It measures in quantitative terms and hierarchizes in terms of value the abilities, the level, the 'nature' of individuals. It introduces, through this 'value-giving' measure, the constraint of a conformity that must be achieved. Lastly, it traces the limit that will define difference in

> relation to all other differences, the external frontier of the abnormal… In short, it *normalizes*. (182-83)

This extensive quote demonstrates the means by which normalcy is created. Instead of addressing groups (as in juridical power), the individual becomes the focus. Each individual must internalize these goals, disciplining his/herself to achieve the expectations of normalcy. This, then, is modern power, power that produces instead of suppresses; Foucault writes: "The individual is no doubt the fictitious atom of an 'ideological' representation of society; but he is also a reality fabricated by this specific technology of power that I have called 'discipline'" (194). Notable as well, this ideal is inherently unreachable. As opposed to clear boundaries of right and wrong established juridically, the ideal disciplined body is a myth that serves to reinforce the internalized correction; one is then never already normal, but always attempting to move closer to the goal.

In *The History of Sexuality*, Foucault specifically defines this disciplinary power as "an *anatamo-politics of the human body*," one form of power which "centered on the body as a machine" (139). Examining the creation of sexuality, he identifies a second form—"*a biopolitcs of the population*." He writes:

> The second [form], formed somewhat later, focused on the species body, the body imbued with the mechanics of life and serving as the basis of the biological processes: propagation, births and mortality, the level of health, life expectancy and longevity, with all the conditions that can cause these to vary. (139)

Here, groups again become a focus of power, but differently from juridical power. The

title of this chapter, "Right of Death and Power over Life," points to the change Foucault notes—the power to kill no longer reigns supreme, but instead the power to control life: population, public health, and production. Qualifications and measurements, i.e., statistics, come to create and regulate populations; in other words, Foucault determines "the growing importance assumed by the action of the norm. […] A normalizing society is the historical outcome of a technology of power centered on life" (144). Norms move then beyond the individual to the society at large, converging on sexuality, creating what Foucault identifies as the myth of repression as represented by the Malthusian couple (itself a myth of ideal sexuality).

Through these works (and others), Foucault problematizes the construction of norms through his understanding of power. Norms are not simply foisted upon one group by another, but instead emerge through interrelationships of anatamo- and bio-power, through self-imposed disciplining. This is a basis of Foucault's power/knowledge—concepts inseparable but not reducible to each other. Here, knowledge is created through practice; those things considered knowledge (e.g., statistics) can elicit the effects of (modern) power; in turn, operations of power (created through vertical, horizontal, and internal interactions) create and enforce that which is considered knowledge. Thus we are complicit in our creation of norms. This reflects a particular perspective on norms shaped by Georges Canguilhem, addressed previously, and also taken up within Disability Studies.

Disability Studies

Disability Studies emerged as a humanities field in the late 1980s; though disability had

historically been addressed through medical, social, and policy studies, disability studies in the humanities, as explained by David T. Mitchell and Sharon L. Snyder, "grapples with the metaphorical and symbolic values that disability has represented," seeking to "understand the ways in which we produce the 'private room' of disability in our most public discourses" (Body 12, 17). The previously addressed theoretical works, particularly those of Foucault, serve as a springboard for much of these studies, which work as both model and methodology.[19] Similar to feminist/gender studies, motivations of the field include bringing awareness not only of/to people with disabilities, but of such representations, complicating their meanings and applications. Conceptions of norming here are tantamount to those in feminist/gender studies as again issues of rights and representation revolve around bodies "fitting" (or not) societal expectations. In disability studies, however, the question is more one of function and performance—measures of ability, particularly as medically defined.[20] As such, several important works also review historical creations of norms, thus often referencing Foucault's *Birth of the Clinic* (as a study of the medical gaze) as well as Canguilhem's work.

Notable then is Henri-Jacques Stiker's *A History of Disability*, in which he explores representations of and responses to disability in Western culture from the Bible and ancient Greece through the late twentieth century. He examines the pervasiveness of disabled bodies and their exclusion on various historical and theoretical grounds, though fundamentally as an issue of difference. Stiker stakes his claim in this examination as follows: "I simply believe that disability happens to humanity and that there are no grounds for conceiving of it as an aberration" (12). Thus, increasing visibility of disabled bodies, exposing the grounds of exclusion, should serve to increase the scope of

normalcy. However, instead of expanding inclusion to enfold difference (not aberration), policies and theories often act on disabled bodies to "help" them conform. In the foreword to the text, Mitchell notes, "As Stiker points out, the rhetoric of integration often pays lip service to the ideal of equality. Legislation is concerned only that disabled people pass the threshold to invisibility" (xiii). This threshold is the masculine norm as explored by de Beauvoir, or Foucault's docile body—that which fades from sight by embodying the (at times) unstated cultural/societal expectations of "normal."

Lennard J. Davis, in *Enforcing Normalcy*, claims the construction of normalcy as the proper ground of examination, explaining, "I do this because the 'problem' is not the person with disabilities; the 'problem' is the way that normalcy is constructed to create the 'problem' of the disabled person" (23-24). He traces normalcy historically through the development and application of statistics first in the state as a whole, then as applied to the body in health and disease. Vital here is the establishment by Adolphe Quetelet of the average man, an "abstract human [who] was the average of all human attributes in a given country. […] a combination of *l'homme moyen physique* and *l'homme moyen morale*, both a physically average and a morally average construct" (26). On either side of this average man falls all others in standard distribution, which, when graphed, created the now-familiar bell curve. We see in Quetelet's intertwining of physicality and morality an enactment of Canguilhem's descriptive and prescriptive normal.

Davis contrasts this norm to the concept of the ideal, using as illustration the story painted by Francois-Andre Vincent, *Zeuxis Choosing as Models the Most Beautiful Girls of the Town of Crotona* (1789, Museum de Louvre, Paris). The painting depicts Zeuxis' attempt to paint the ideal woman, which begins by gathering all women in the village. He

decides that none is ideal, and instead paints ideal parts of various women, creating an ideal woman who is really the amalgamation of many individuals. This demonstrates the completely constructed and dichotomous concept of "ideal"—the ideal (represented by no one) stands opposed to the non-ideal (representing everyone). The norm, on the contrary, "implies that the majority of the population must or should somehow be part of the norm. The norm pins down that majority of the population that falls under the arch of the standard" (29). Davis argues that this turn away from the ideal and towards the norm is problematic: when the model was "ideal," no one could reach it, and thus greater variety was accepted; when the model is "norm," all are expected to conform. Though parallels could be drawn to Foucault's juridical (ideal) and modern (norm) power, Davis interprets these changes a bit differently. For Foucault, the "norm" is the unreachable goal for which everyone must strive and, inevitably, fail. Instead of creating ground for variation (as in Davis' "ideal"), the unattainability of this norm reinforces the need to comply, to discipline the self to this form (the process of modern power). In both, though, the concept of "norm" clearly wields conformative power.

"Norm" becomes "normate" in Rosemarie Garland Thomson's *Extraordinary Bodies*, where she integrates both historical and literary analyses of disability, applying and extending feminist theories to this field. She, like Davis, queries this "normate" body, a neologism she coined that "names the veiled subject position of cultural self…[and] designates the social figure through which people can represent themselves as definitive human beings" (8). She employs Erving Goffman's description of a standard, American male as representative of this concept: "'a young, married, white, urban, northern, heterosexual, Protestant father of college education, fully employed, of good complexion,

weight and height, and a recent record in sports'" (8). This list is precise and exhaustive in many categories, though masculinity and able-bodiedness are simply implied. Thomson explicates this, arguing that those outside of the normate, specifically the "disabled figure," then serve "as the vividly embodied, stigmatized other whose social role is to symbolically free the privileged, idealized figure of the American self from the vagaries and vulnerabilities of embodiment" (7). She thus exposes another structure, much like the category of woman, that unwittingly supports this social norm by being constructed as its dichotomous negative.

Integrating work from Kristeva and Foucault, Thomson also relates the construction of the disabled body to both the abject and the docile body:

> Constructed as the embodiment of corporeal insufficiency and deviance, the physically disabled body becomes a repository for social anxieties about such troubling concerns as vulnerability, control, and identity. […] Disability, then, is the attribution of corporeal deviance—not so much a property of bodies as a product of cultural rules about what bodies should do. (6)

Thomson argues that a disabled body is corporeally insufficient, inherently non-normative, failing to achieve some standard of physical and/or mental capability and/or functioning. The disabled body is too much of a body—a body of "corporeal deviance," with social anxieties about its "control." Throughout literature and history, disabled bodies are often considered as or demonstrated to be monstrosities; they are not disciplined, they do not remain within the bounds of expectations or normalcy.[21] These bodies deviate, expand beyond themselves through unexpected actions, uncontrollable

fluids; they are implicitly *not* docile, normate bodies.[22]

While Thomson exposes the construction of the unruly body, Mitchell and Snyder also return to the invisibility of the norm in *The Body and Physical Difference* and *Narrative Prosthesis*. Again, they emphasize the importance of querying the norm, claiming "Normalcy studies debunk the norm as an ideological abstraction that is based upon a faulty empiricism" (*Narrative* 29). Mitchell and Snyder also explore representations of disabled bodies in literature and culture, with an underlying theme emphasizing a move away from mere representations towards more realism. Unlike Thomson and Davis, who turn to feminist studies as a model, they critique the embrace of identity-based studies, claiming:

> In all of these cases [of gender/race/sexuality studies], biological inferiority had to be exposed as a construction of discursive power. […] In this regard, disability occupies a unique identity that must navigate the terrain between physical/cognitive differences and social stigma. No purely constructivist reading can adequately traverse this political and experiential divide. (Narrative 3)

Indeed, shedding the mantle of the denigrated flesh offers power to some disenfranchised groups, though we could argue that theorists like Butler do not give "purely constructivist reading(s)." But, constructed as the term disability is (and some concepts of disability are), corporeal differences indeed cannot be explained away solely by discourse. If someone has an arm amputated, or is blind, or becomes paralyzed, their body operates in a way that is different from many other bodies.

From this stance, and in explanation of their title *Narrative Prosthesis*, Mitchell and Snyder reflect on prosthetic intervention in disability:

> The need to restore a disabled body to some semblance of an originary wholeness is the key to a false recognition: that disabilities extract one from a social norm or average of bodies and their corresponding (social) expectations. To prostheticize, in this sense, is to institute a notion of the body within a regime of tolerable deviance. If disability falls too far from an acceptable norm, a prosthetic intervention seeks to accomplish an erasure of difference all together; yet, failing that, as is always the case with prosthesis, the minimal goal is to return one to an acceptable degree of difference. (6-7)

Building from the works reflected upon here, as well as David Wills' *Prosthesis*, they consider the rhetorical and literal play of prosthesis as addition, in this quote exploring the potential of prostheses to normalize a deviant body.[23] However, as Wills argues, this attempted restoration serves instead to reveal the false construction of this wholeness, "because the whole never was anywhere" (15). By destabilizing literary prosthetizations that attempt to recreate this wholeness, Mitchell and Snyder reclaim "a variegated and politicized disabled subjectivity" through studying disability in literature (10).

Unfixing the Norm

"To the extent that living beings diverge from the specific type, are they abnormal in that they endanger the specific form or are they inventors on the road to new forms?" (Canguilhem 141)

This overview reveals, again and again, how the constructions of "normal" fast become invisible, inscribing bodies as "other" and serving as bases for discrimination. In the

realm of gender and disability studies, exposing these norms is often the first step in attempting to expand their definition, or even eliminate their very existence, also then eliminating perceived and enforced inequalities. Yet, also again and again, norms are reinscribed (which I will continue to explore throughout this work). Or, once again, perhaps better seen through Canguilhem's analysis, norms are malleable, and "should changes in the environment occur, life will be able to find the solution to the problem of adaptation" (143). And this, then, brings us back to Oscar Pistorius' case. The CAS Arbitral Award demonstrates a malleability of norms. Upon Pistorius' appeal, the CAS showed both insight and foresight in their analysis of the initial IAAF decision, teasing out rhetorical complications and ambiguities, and expanding their perception to include a man who appeared as part-machine. However, though they granted eligibility to a body that was not solely "natural," they did so in light of its ability to pass as natural. In other words, Pistorius' prosthetic legs were allowed because they did not seem to work any better than natural legs. These "technical devices" did not impede. But "technical device" still remains unqualified.

Here lies the basis of my argument. Pistorius is simply one example of changing bodies. In this example, the change lies at two levels. The first, and most obvious, is the prosthetic level. His prosthetics are technologically advanced, and his use of them has allowed significant achievements personally and more broadly in the competitive sports arena. This advancement resulted in praise and uproar—concerns of technological robots taking over sports reverberated far beyond the IAAF to countless headlines and commentaries in countless media outlets. And yet comparatively, Pistorius' prosthetics are also relatively simple. Clear lines separate flesh and metal. Other new technologies,

such as myoelectric arms, complicate these boundaries far more. As suggested by Wills and Mitchell and Snyder, prosthetics reveal the myth of the normal body as "the whole."

The second level of change is exemplified by Pistorius' own comments: "I'm not disabled, I just don't have any legs." Or perhaps more specifically, he does—he has many legs from which to choose, suitable for different occasions and events. To him, this *is* natural, normal. Canguilhem writes, "In the final analysis it is the patients who most often decide—and from very different points of view—whether they are no longer normal or whether they have returned to normality" (119). Pistorius embodies this claim, to an extent, except I suspect he would reject the word "patient" as he does the word "disabled." Thus his self-conception, his rejection of categories that would serve to define him, demonstrates a change not only physically, but at the levels of discourse and self-identity.

In light of these changes, some, like the IAAF, respond with anxiety, with a desire to maintain and reinforce a cultural story of the natural body. I disagree. This then is my work in the following chapters. I question this story, holding it alongside alternate understandings of bodies as variously constituted and constructed, and against the actual practices of contemporary bodies in relationship with technology. The story goes like this:

> A natural body is absolute, removed from any influence or interaction with society, culture, or technology. It is pure and untouched, held forth as an ideal state for bodies. "Outside" forces contaminate this purity and must be mitigated. The influences of the non-natural on the natural create bodies with unfair advantages, or alternately reveal lacking bodies, inferior to natural (implicitly also

whole, unmarred, fully-functional) bodies.

This story does not operate to convince us that we have "advanced" as a culture, or thrown off the shackles of former repressive beliefs. The natural body myth instead invokes such prior beliefs, acting as a call to return to more "pure" times. It is a myth cited when issues of bodily enhancement come into play, i.e., Pistorius' situation; the invocation of a natural body is used to reject or deny alterations that are deemed unnecessary.

However, in practice, countless scenarios violate this myth, and are often even acceptable in the context of the very myth. Generally, it is admissible to alter a body with technology if that alteration serves to correct the body, to bring it closer or restore it to "normal." Hence, eye glasses, hip replacements, prosthetic legs, even breast enhancements can be acceptable within this myth. It is when technology serves to (supposedly) enhance the body that contention may occur. Context matters: Pistorius' prosthetics were not at issue until he wanted to compete in the Olympics against able-bodied men. In potential direct comparison, the "natural" body is preferred over that which has been (implicitly, unfairly) enhanced.

This construction and myth ties directly to Foucault's conceptions of modern power and discipline in the creation of norms. I see two overlapping or interrelated normative maps—one of the natural body and one of the ideal body, where ideal means a very specific sense of health, function, and aesthetics. While the definition of "natural" seems to remain stable over time, that of "ideal" is malleable, dependent on scientific and medical advancements in understanding the body—again, related to Canguilhem's claims.[24] This creates a dialectic between the spheres; with medical advancements in

measuring and defining "health" often come more ways of intervening on the body to create that "health" (e.g., changes in diet and exercise; the addition of medication). These interventions, often technological by definition, pull at the definition of natural, revealing it to be in fact quite unstable and also malleable. Throughout these spheres runs the force of anatomo- and bio-politics.

We need to bring a(nother) new understanding to the body, one better aligned with actual contemporary practices and likely future relations between technology and the body. Oscar Pistorius is perhaps one of Canguilhem's inventors, showing us the road to new forms. In the next chapters, we will follow that road, and I will posit a new conception of these changing bodies. First, though, we must examine other cultural anxieties that restrict our acceptance of these changes.

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[1] Quoted in an article by Robert Philip.

[2] The pdf of this document can be downloaded from the IAAF website: http://www.iaaf.org/aboutiaaf/publications/ruels/index.html

[3] This description has much vagueness, but is culled from the IAAF website. Unfortunately, nowhere do they state a clear mission or purpose, outside of keeping statistics and "governing."

[4] I am using pages 99-100 of the *2008 Competition Rules*; the addition in 2007 is verified in multiple documents, including Pistorius' Arbitral Award (p. 7).

[5] Various aspects of this are recounted in numerous news articles and interviews. However, I am relying specifically on the text of the CAS Arbitral Award for its official, comprehensive account of the case.

[6] Cited from the abstract of the 15 Dec 2007 Cologne Report, in the CAS Arbitral Award, p.9

[7] CAS Arbitral Award p. 16

[8] Two other issues were determined in the arbitration–one concerning the IAAF's jurisdiction, the other concerning whether the IAAF decision was unlawfully discriminatory. The first was dropped later in the case, and the second was rejected by the CAS. Though interesting, neither are necessary for my discussion here.

[9] In his introduction, Foucault specifically notes those influenced, including Althusser, Bourdieu, and followers of Lacan.

[10] There is some resonance here with Haugeland's definition of intimacy in terms of the embodied and embedded mind, particularly in the example of the ant and the beach. I'll return to his work in a later chapter. (*Having Thought*).

[11] Of course, in his characterization of the sexes in *Generation of Animals*, Aristotle goes further than simply naming women as "other," calling women "monstrosities," establishing an implicit relationship between normalization in sex and physical ability that extends for centuries. Rosemarie Garland Thomson discusses this conflation of women and disability at length in *Extraordinary Bodies*. I will return to discuss Thomson's work a bit later in my overview of norms through Disability Studies.

[12] The relationships of language and logic to linearity and (phal)logocentrism can be traced to Plato's Phaedrus, where Socrates explains that, while rhetoric is an art of persuasion, of knowing and moving ones audience, there is an essential Truth that underlies all. That Truth is the ground from which one speaks—and it is the spoken word as well as the male sex that are privileged within this move. Irigaray is influenced by Freud and Lacan, and particularly Derrida. Derrida, of course, famously deconstructs these claims, arguing that the fallacy of logocentrism and the inescapability of differánce are both productive and foundational in destabilizing a conception of an absolute Truth. For Derrida, this problem of language spills into all else–philosophy, knowledge, all understandings of life–as language is that which constructs our world.

[13] I'll tease out this conflation of natural and norm shortly, particularly as I turn to Anne Fausto-Sterling's work.

[14] This move also intersects with Foucault's work, where we are shaped not only by our discourses, but "practices," defined by Foucault as "places where what is said and what is done, ruled imposed and reasons given, the planned and the taken for granted meet and interconnect" ("Questions" 75). Todd May states this more straightforwardly, claiming, "Practices are what people live. They determine who we are not by imposing a set of constraints from above, but through historically given norms through which we think and act" (18).

[15] This concept is explored in Burke's *Language as Symbolic Action*.

[16] This deconstruction also has a long history in rhetorics and philosophy of science, particularly in the works of Thomas Kuhn, Paul Feyerabend, Alan Gross, Bruno Latour, Jeanne Fahnestock, and Randy Harris, among many others. I address in particular the role of rhetorics of science in constructing a "mechanical" body in chapter three.

[17] I explore docile bodies more extensively in chapter three.

[18] Lesser crimes, such as against an individual's property, were not seen as offences against the king's body, and required types of punishment different from the physical torture often inflicted on criminals. For the purpose of overview, I am simplifying Foucault's extensive analysis of discipline and power.

[19] Interestingly, most authors seem to pull from the archaeological model of *Birth of the Clinic* instead of Foucault's later genealogical studies.

[20] Notably much work in disability studies aims to move beyond these medical models, though they still serve as a backdrop to the field.

[21] See Helen Deutsch and Felicity Nussbaum's *"defects": Engendering the Modern Body*

[22] See Mary Douglas' *Purity and Danger: An Analysis of Concepts of Pollution and Taboo*

[23] I address this more fully in chapter three.

[24] Consider as an example medical statistics: where once height, weight, and age were used to determine norms of health, now results of blood tests (levels of cholesterol, triglycerides, iron, etc.) are also mandatory, creating a more specific and encompassing definition of "healthy."

Chapter Three

Docile Bodies, Supercrips, and the Plays of Prosthetics

> *Let us take the figure of the prosthetized body as it is seen in the twenty-first century. To begin with, the prosthetized body was invisible, completed by a life-like limb that allowed the figure to pass as whole; now, she bears certain signs of her strength and courage, the marks, too, of her pride; her body is the blazon of her strength and valour; and although it is true that she had to learn the means of working her limbs little by little—generally in actual motion—movements like running and attitudes like the bearing of the head belong to the most part to a bodily rhetoric of honour; ...By the early twenty-first century, the body has become something that can be made; out of a formless clay, an inapt body, the machine required can be constructed; posture is gradually corrected; a calculated constraint runs slowly through each part of the body—flesh or otherwise—mastering it, making it pliable, ready at all times, turning silently into the automatism of habit; in short, one has 'got rid of the disabled' and given her 'the air of an athlete.*[1]

In the previous chapter, we examined Oscar Pistorius' story as a demonstration of an officially negotiated prosthetic body in the arena of sports and competition. As prosthetics become more visible, more obviously technological—like Pistorius' Cheetah leg, as opposed to legs that serve only to "pass" as biological limbs—more questions arise as to the meaning of prosthetized bodies. How, then, do we read other public examples of prosthetized bodies? In addition to issues of fairness, equality, and normality, as addressed in Pistorius' story,

anxieties often emerge around issues of mechanization and control. The opening to this chapter, a not-so-subtle remix from Foucault's *Discipline & Punish*, is one potential reading of contemporary prosthetized bodies as represented in popular media. It encapsulates the embrace of and anxiety about prosthetized bodies, on one hand figures of strength, valor, and courage; on the other, automatons, constructed machines. These are the bodies I am again most interested in here—ones that, like Pistorius, balance on socially perceived precipices of dis- and super-ability, challenging existing constructions and theorizations of bodies.

Three particularly interesting representations of such figures came to public attention in 2007: Heather Mills, who competed on *Dancing with the Stars*; Sarah Reinertsen, a tri-athlete who was featured in the 2007 Lincoln "Dreams" advertising campaign in television commercials and print ads; and Cherry Darling, a character in Robert Rodriguez's film *Planet Terror*.[2] Through three different media, these three represent complicated figures open to adulation, apprehension, and interpretation. In some ways less obviously contentious than Pistorius, their stories resonate with similar anxieties about technological interventions on bodies. As prosthetized women, their representations demand particular analysis from feminist and Disability Studies lenses. Are they the next iteration of controlled, docile bodies? Superheroines of disability and the female form? Something else entirely? In this chapter, in addition to reading the stories, as I did with Pistorius, I will read the visual representations of the bodies of Mills, Reinertsen, and Darling to consider their social resonances and implications. Here, we move a bit from concerns of the norm to concerns of the disciplined; where Foucault maps the techniques of disciplining through institutions, I map the terrain of these bodies as represented in media, exposing the fissures between representation and experience. I will explore the potential readings of prosthetized bodies as

penultimate docile bodies (if full mechanization represents the ideal docility), and then destabilize this perception, suggesting new readings of these bodies.

Before this analysis, however, we must see Mills, Reinertsen, and Darling contextualized within their representations. I will give specific if peculiar close readings, isolated in limited contexts, mixing a fictional character from a horror film with two real women; however, as all three representations appeared in the same timeframe, they demonstrate an interesting constellation of prosthetized bodies in the public eye.[3]

Contests, Contexts, Concepts

She Makes You Feel Like Dancing

In the spring of 2007, Heather Mills made quite an impression on *Dancing with the Stars* (DWTS), an ABC television show where celebrities pair with professional dancers, competing for best performances. Despite international recognition as an activist and a former model, Mills' "stardom" was only tangentially represented by these achievements; instead, her status as an amputee with a prosthetic leg underscored her participation in the competition.[4] She addressed her goals for her performance in an interview with Nick Watt, stating, "What I'd wanna show is that you can actually get out there and do anything that you wanna do with an artificial leg." Her performance on the show is in part notable for its lack of notability: she appeared "normal," both in function and in appearance—her prosthetic looks like a "regular" leg and was often displayed by daringly slit skirts. Throughout her stay in the competition, judges often commented on how "able" she was, despite/with her prosthetic leg:

> "I think you're an inspiration to people to get out and dance." (Len Goodman)

> "I think I'll have to rename you as the incredible Heather Mills." (Bruno Tonioli)
>
> "One, two, three legs, I don't care how many - you did a fantastic job." (Tonioli)[5]

On one hand, this is very positive—Mills presents (and represents) someone with a disability, a prosthetic, embracing life and achieving, not being restricted by her difference.

However, another dialogue emerged at the same time. During her performance, Mills was also fodder for extensive jokes, particularly among the late-night shows. Notably, she is a contestable figure—a pseudo-celebrity with a questionable ethos—and she certainly is not well-liked in the British press.[6] "Dancing with the Stars," in the genre of reality television, also has ethos problems of its own; it is certainly popular culture, a fun show with little deep substance. Humor is thus neither unexpected nor inherently inappropriate. Since Mills is a "celebrity" and willingly joined the show to presumably enhance her image, she is in some ways an acceptable "victim" for the jokes. But the jokes did not only center on her personality—they focused on her prosthetic. Chatter in online forums revealed tremendous anticipation of her prosthetic leg coming off mid-dance, which was represented in part by a YouTube video that was an altered clip of one performance.[7] When her partner dips her, she extends her leg; the video concludes with a comic graphic of the prosthetic leg popping off (complete with popping noise), and flying across the screen.[8] Other such videos emphasized her mechanization, for instance showing her leg with a rocket-booster used to improve flips.[9] In sum, these suggest at the least a partial rejection of Mills as a positive model of ability, at the most a deep anxiety about what prosthetized bodies mean in the realm of competition.[10]

Dream a Little Dream

In 2007, Lincoln began a new advertising campaign for the 2008 Lincoln MKZ. Called "Dreams," it highlighted inspiring messages, for example, Harry Connick, Jr. driving through New Orleans (in the MKZ) while talking about his dreams for the rebuilding of his hometown. Another ad featured Sarah Reinertsen, a marathon runner who is also a single above-the-knee amputee.[11] The commercial begins with Reinertsen driving the MKZ through Central Park; the viewer is positioned outside of the car, and can see Reinertsen behind the wheel looking relaxed and happy.[12] We hear her in a voiceover as she drives, calmly speaking each sentence, pausing before each subsequent line: "I've never hiked the Grand Canyon. I've never climbed Mount McKinley. I've never biked across America." The car rolls to a stop, and Reinertsen exits. Immediately obvious is her prosthetic (since it's on the left, it emerges from the car first), an Ossur Flex-run.[13] She is wearing a form-fitting tank top and shorts, revealing her fit figure. "I've never won a marathon." She begins running, joining a group of other runners (without visible prosthetics). "Yet. My dream is to do extraordinary things every day." Reinertsen continues running, and the voice-over continues with the voice of the spokesman saying, "Introducing the new 2008 Lincoln MKZ. So agile, so responsive, it can take on any challenge. Life's calling—where to next?"

The campaign also ran a related print advertisement.[14] This two-page spread shows Reinertsen again in the park in New York. The background includes blue sky, a large bridge, and peaks of the skyline; trees obscure part of the bridge/skyline view and frame the back edge of the grass, which extends from the back to the foreground of the picture. On the left page, the MKZ sits in the grassy mid-ground, silver with black tires (and black shadow beneath), sun glinting off the windshield and hood. Centered on the right foreground is

Reinertsen, in a black sports bra, tight running shorts, and one black sneaker. She stands stretching, legs spread, right hand extending over her head, left hand on her hip. She looks into the distance smiling, her long, blond hair framing the left side of her face. Defined muscles in her right leg, stomach, and right arm emphasize her fit physique. Her left prosthetic leg, mostly black except for the metallic knee, is also noticeable because of the short shorts and in contrast to her fleshly right leg. On the right page, above the bridge and next to her extended arm, is the following text:

> Don't ever give up on what you believe in.
>
> Not once.
>
> Not ever.
>
> *My dream is to do extraordinary things every day*.
>
> Life's calling. Where to next?

Below this, next to Reinertsen's body, is this text:

> *Power On*
>
> My parents always treated me like any other kid. And when I fell, my mom didn't always rush to pick me up. "Sarah's going to pick herself up." It was a really important lesson for me to learn. For me to keep up, I always had to be tougher than the rest. And I think that's still true today. – *Sarah Reinertsen*

On the bottom right, next to Reinertsen's prosthetic leg, is Lincoln's logo, name, and tag phrase "Reach Higher." A line runs across the bottom of the page, right beneath Reinertsen; below this is the following text: "The new 2008 Lincoln MKZ with a 263-hp V6 and a smooth 6-speed automatic. So agile, so responsive, it can take on any challenge."

The "Dreams" campaign seems primarily driven by pathos and ethos; there is no direct relationship between the car and the dreams, short of the star driving the car to the "dream" location.[15] The company is marketing lifestyle, banking on the emotional connection the audience feels with the dreams, building their reputation from the presumed relationship between Lincoln and these dreams. In Reinertsen's ads, the pathos for the audience emerges from her ethos, her achievements in overcoming her perceived disability by becoming an accomplished runner. This is the "turn" in her commercial; while driving in the car, she appears like any other average (i.e., "normal") person waxing on about amazing physical feats she has not accomplished (climbing mountains, biking across nations). Most people have not done these things, and perhaps can relate. Upon stepping out of the car, however, her difference is revealed—this coincides with her saying "I have never won a marathon." Suddenly, these feats are not so average. Sure, Reinertsen has not *won* a marathon, but she competes. She is clearly, visibly an athlete, something few people can claim, and she is an athlete with a prosthetic; this simultaneously narrows the field of comparison and increases the awe of accomplishment. The print ad plays on an opposite construction; instead of emphasizing her difference, it emphasizes her sameness. In her own words, Reinertsen explains that her parents raised her to be "like any other kid"—independent and self-sufficient. Except here, this sameness only reinforces her difference: she could only be the same by working harder, being "tougher." She could only be the same through overcoming her difference. This works in the same way as Mills' emphasized sameness, drawing attention to the very difference it seems to erase. I will return to the relevance of this; I first want to address another construction in these ads.

The second angle or intersection of this ad turns on the relationships of flesh and technology. Paramount in Reinertsen's accomplishment is her prosthetic—this very visible technology that is mimetic to an organic leg only in function, not appearance. In the print ad, her prosthetic resonates visually with the technologies of the bridge, the skyline, and most notably the car. These objects stand in contrast to the "natural"—the green trees and grass, and Reinertsen's mostly exposed, fleshy body. The ad emphasizes the distinctions and connections between technology and nature. Lincoln implies this as well through the description of the MXZ: "So agile, so responsive, it can take on any challenge." In this ad, the car is not actually asked to perform anything challenging; instead, this creates a parallel to Reinertsen's prosthetic leg. It is *that* that is agile and responsive, demonstrated most in the commercial. There, with only a slight hesitation, we see Reinertsen run smoothly in a pack of other strong (and able) athletes. Implicitly implicated then is also Reinertsen's body—it too, with mechanical, trained precision, is agile and responsive, taking on the challenge of the race and, perhaps even more so, the prosthetic.[16]

She's Just Cherry

The third figure for inquiry is quite different than Mills and Reinertsen, both in construction and in kind. Cherry Darling (portrayed by Rose McGowen) is the main heroine in Robert Rodriquez's *Planet Terror*, the first film of the Tarantino/Rodriguez double feature *Grindhouse*. While attempting to find herself and start over after another failed endeavor, she unfortunately stumbles into a *Night of the Living Dead*-esque situation; she is attacked by zombies, her right leg ripped off and stolen (presumably for the eating). Her boyfriend, El Wray, takes her to the hospital, where she wakes to find her newly amputated leg post-

surgery, with a short, rectangular metal peg extending from the neatly gauze-wrapped stump. Unfortunately (again), zombies attack the hospital, and she must choose: submit to defeat and die in her hospital bed, or quickly overcome her trauma and escape. Wray helpfully berates her into fighting, and fashions the first of two prosthetic legs. "Fashions" is an overstatement; Wray breaks off a long, wooden table leg and slams it into Darling's metal peg. After some momentary help from Wray, Darling quite effectively hobbles off on this new prosthetic, evoking images of Captain-Hook-esque pirates, escaping the horror of the hospital, and killing a few zombies along the way.

Later, while fighting off a zombie soldier/guard/rapist, Darling breaks her pegleg. Not to worry—Wray has already created her next, far-more-technologically-advanced prosthetic: a large (and functioning) combination M4A1 carbine assault rifle/M203 grenade launcher. Darling takes to this leg even faster than the pegleg, immediately standing, walking, and using the rifle to blow away first the rapist, then several other zombie soldiers/guards (and a small radio, just for good measure).[17] From here, she continues contributing to the battle against the zombies, finally saving the day with a go-go-dance-inspired assault that enables her to flexibly shoot and launch grenades with sniper-like precision. She and her friends escape to begin a new life.

Clearly a campy reconfiguration of past campy zombie movies, *Planet Terror* does not offer as direct a reflection of society as does a reality TV show or an ad campaign (though those are certainly also quite constructed reflections themselves). Around the time of the movie's release, there was very little media discussion of Darling—none in academia, and comments found in broader searches (Google, etc.) were mostly passing description of her as a curiosity or a sex symbol.[18] In conversation, I found many people were disturbed,

intuitively and ethically, by the idea of a prosthetic gun-leg; yet Darling seems to have been disregarded as easily as zombies—as mere figments of our imagination (we hope). But science fiction and horror movies often reveal something greater about social issues and anxieties. Rodriguez comments on this in an interview with Charlie Rose, claiming that "…these kinds of exploitation movies always seized on something that was happening during the day, even before Hollywood wanted to talk about them." Rodriguez was specifically addressing his zombies, which were created as a result of a biotech infection related to the Iraq war. However, this perhaps applies to Darling's altered body as well, her gun-leg forecasting the next level of potential reconstructions. Here, we have a post-apocalyptic prosthetic that, in most circumstances, would be extremely problematic, both in ethics and in function. This is not the previously standard version of the positive amputee integrated into "normal" society, with a body that reflects that normalcy both visually and functionally (such as we see with Mills). This imagery is closer to that of Reinertsen and Pistorius—the relationship between metal and flesh is highly visible. However, Darling's prosthetic is no mere carbon-fiber blade; this is the terrifying, person-not-only-as-machine, but as machine-gun, future. Forget issues of fairness in the Olympics—Darling can just blow your head off.

Yet despite this (as yet) unrealistic prosthetic, Darling's representation has some resonance with those Mills and Reinertsen; in this, she also stands outside of other representations of (science) fictional characters. Prosthetic gun-limbs are not new in this genre of movies. Different, though, is the purpose and role. Darling has not been specifically created as a fighting cyborg for the police or military, but instead is a stalwart victim/survivor who by chance and necessity gains a gun-leg. Most interesting here is the sub-narrative of Darling's character development. Throughout the movie she delivers one-liners about her

bevy of useless talents: go-go dancing is useless talent #12, a yogic "wheel" position, useless talent #166. Pre-zombie attack, she is a lost soul—her life lacks purpose and reason. This changes with the delivery of her gun-leg:

> Cherry: He [the zombie-rapist] broke my leg.
>
> Wray: It's okay. I made you something. [attaching gun-leg] I do believe in you. Always have. I believe that you could be better, you deserve better, even better than me. Right now, I need you to become who you're meant to be. Stand.
>
> [Cherry stands on her new prosthetic]
>
> Wray: Open that door, will you baby?

With that, Darling balances on her biological leg, aims the new prosthetic into the air, shoots the door open, and begins her assault on the zombies (again, culminating in her go-go dance onslaught to freedom).

While Darling represents the extreme of the unnatural prosthetic, she also represents most explicitly the potentiality of a body reconceived. The narratives of Mills and Reinertsen only suggest or give brief glimpses of their lives pre-amputation; in Darling, we see the full narrative arc made possible by fiction. Life in her "natural" body had thus far been unproductive, disappointing, and depressing; she was merely a collection of "useless skills." Once she receives this gun-leg, we find that she is in fact extremely functional, saving the world and, in the process, becoming who she was, as Wray claims, "meant to be." She surpasses the boundaries of her flesh through literal loss and replacement, becoming whole only through this integration with technology. Wray's speech resonates with Reinertsen's advice from her parents to "pick herself up," perhaps going even a step further, to "make

herself up." Darling's prosthetic does not just allow her to regain "normal" function, but to reconstruct her self, physically and subjectively.

These readings of Mills, Reinertsen, and Darling offer fertile ground for further analysis. The examples all work a bit differently, in part due to the media. Mills' story plays out within a specific role—a dancing competitor on a television show—over a period of several months, allowing a broader summation. We need not consider every episode, as her role and the responses of the judges and audience remain consistent, reinforcing the construction of Mills' that I spelled out above. Reinertsen's representations are quite finite: the print advertisement is entirely static and contained, and the related short television commercial follows the same minimal story arc. These create extremely limited representations of her actual identity. Darling exists as the only fully-constructed character. Though somewhat ironic, as she is fictional, this also fixes her identity in a restricted frame. However, there are enough similarities between the women, in both bodies and stories, to allow for a meaningful analysis. What we have here are three attractive, physically fit women with prosthetic legs "performing" in the public eye; we also have three interrelated operations in play—stories of overcoming disability, the potential shaping of docile, mechanized bodies, and rhetorics of replacement. All depend on the figures achieving a norm, "fixing" their bodies to a state of ability and achievement, though the extents to and means by which this is accomplished differ.

Reading the Body

Against all odds

The images of Mills, Reinertsen, and Darling, though positive in many ways, suggest a problematic conception of disability and prosthesis, one that eventually translates to a greater anxiety about a mechanized non-human figure. Disability Studies identifies this as the image of the "supercrip." Joseph P. Shapiro writes,

> The stereotypes of Tiny Tim or supercrip have slowed the progress of disabled people toward full inclusion in American life. To be seen as a patient or in need of charity is to be thought incapable of the same life as others. To be lauded for superachievement is to suggest that a disabled person can turn pity into respect only at the point of having accomplished some extraordinary feat. (60)

One potential reading of these examples falls simply and directly into this realm. Darling's story clearly plays out this narrative, particularly when she first wakes in the hospital room, emoting, "Look at me…I'm pathetic…I have no leg!"[19] Both here, when attaching the wooden table leg, and later, with the replacement gun-leg, Wray's responses demand her rejection of this self-pity, simultaneously taunting and encouraging her to "overcome." She does, indeed acquiring "superachievement" with her deadly superheroine-esque antics (however ethically problematic they may be). But of course, this is comedic science fiction, and thus a not-unexpected plot line.

Both Mills and Reinertsen also certainly demonstrate "superachievement;" indeed, one might be hard-pressed not to respect these accomplishments, performed with or without prosthetic legs.[20] Interestingly, their participation in a popular television show and a major

advertising campaign suggest a "full inclusion in American life," or at least something closer to that than we have seen in the past. And what's wrong with this? Individually, nothing—these women have accomplished tremendous feats and deserve recognition. Positive images of women with prosthetics in popular culture increase representations of difference, which in turn (one hopes) increases acceptance of said "differences" (an argument employed in issues of gender and cultural representation). This is a means of inclusion, something fought for by communities of disabled activists. However, as a cultural model, this also represents a potentially problematic normalizing.

The image of the supercrip is in part one of a disabled body turned "normal," not restricted or limited by its very condition. As we saw in chapter two, in Foucault, this process of normalizing emerges through punishment, operating by comparing bodies, behavior, functions to one another and to minimum thresholds, shaping and establishing (un)acceptable frames of difference. Normalizing comes to function throughout disciplines—education, industrialism, and, most importantly here, medicine. A disabled body by definition would be medically (and thus also socially) *not* a functional, "normal" body. Foucault notes, "degrees of normality indicate membership of a homogenous social body but also play a part in classification, hierarchization and the distribution of rank" (184). If a body is marked as outside the "homogenous social body," it is then subject to hierarchization, to low rank, to less power and more discrimination. A supercrip, then, is a disabled body that has succumbed to punishment, that has achieved "the constraint of conformity," and that has superceded its low ranking to appear normal and acceptable. Only then, according to Shapiro, is it seen as worthy of respect by other normal bodies; it is no longer a misbehaving body, or the

"embodiment of corporeal insufficiency and deviance," as Rosemary Garland Thomson notes (6).

The problem of the story of the supercrip quickly comes into focus. Though positive in some respects, this story reifies a particular conception of a normal body, creating an expectation that all disabled bodies should achieve. It limits what is seen as acceptable, thus, as Shapiro notes, limiting the "progress of disabled people toward full inclusion in American life." However, in the case of Mills and Reinertsen, this focus also serves to reinforce the recognition of the prosthetic, calling attention to their achievements of "normal" despite their lack of physical "normalcy." So, we get a double-effect here—we see strong, healthy, attractive women who are extremely capable, going beyond expectations, showing that they are just like everyone else (sort of); yet the reason for this attention is specifically their amputation/prosthetic, that which inherently defines them as different, as other, as outside of normal.[21] They (and others) note their tremendous bravery and achievement again because/in spite of their disability.

The very use of prosthetics themselves creates another layer of complication. David Mitchell and Sharon Snyder consider this in *Narrative Prosthesis*:

> To prostheticize, in this sense, is to institute a notion of the body within a regime of tolerable deviance. If disability falls too far from an acceptable norm, a prosthetic intervention seeks to accomplish an erasure of difference all together; yet, failing that, as is always the case with prosthesis, the minimal goal is to return one to an acceptable degree of difference. (6-7)

The very act of prosthetizing the body can here be seen as yet another attempt at normalizing; again, particularly for Mills, her prosthetic leg quite literally works to erase difference,

visually mirroring her natural leg, down to a foot encased in a high-heeled shoe. For all three women, prosthetic intervention indeed allows them the ability to physically achieve their goals, in fact surpassing standard achievements for disabled and abled bodies. Now, two points are vital. First, Mitchell and Snyder are not suggesting that people with amputations should not have prosthetics, but instead are questioning the (particularly metaphorical) work of prosthetics. Their book continues by querying the cultural effects of prosthetic representations in literature; this perspective is clearly relevant to this analysis of figures in popular culture.[22] Second, this critique does not entirely hold here. Functionally, yes, the prosthetic legs do their work. However, for these women, prosthetic invisibility is not achieved, nor does it seem to be the goal. These women are not attempting to "pass" as non-disabled—Reinertsen's and Darling's legs are quite obviously prosthetic, and as mentioned previously, they in no visual way resemble a natural leg; even though Mills' prosthetic visually matches, she discusses it regularly, showing it alone (i.e., not attached) during appearances such as that on the Larry King Show.

In light of the "supercrip" model then, these women all appear as complicated representations. Though positive in many ways, the construction of Mills and Reinertsen (in which they are both notably complicit, willing participants in the media) could be read as problematic idealizing. However, their relationships with their prosthetics suggest something else—a comfort with a malleable body, one subject to change and alteration. Darling pushes this even further, altering the body beyond any sense of normalization. These women do not exist "only to disappear" into a category of "normal" bodies, at least in the frame of dis/ability (Foucault 182). But the changes and alterations of bodies can still be read through other disciplinary frames.

Now I'm in Control

Let's return to the remixed quote that opens this chapter and once again:

> *…take the figure of the prosthetized body as it is seen in the twenty-first century…. By the early twenty-first century, the body has become something that can be made; out of a formless clay, an inapt body, the machine required can be constructed;… a calculated constraint runs slowly through each part of the body—flesh or otherwise—mastering it, making it pliable, ready at all times, turning silently into the automatism of habit; in short, one has 'got rid of the disabled' and given her 'the air of an athlete.*'

Foucault writes, "A body is docile that may be subjected, used, transformed and improved" (136). The docile body is one produced by exercises of minutia, particularly for the soldier (though also the student, the worker, and so on). The goal of a disciplined body is an economy of control:

> …to construct a machine whose effect will be maximized by the concerted articulation of the elementary parts of which it is composed. Discipline is no longer simply an art of distributing bodies…but of composing forces in order to obtain an efficient machine. …The body is constituted as part of a multi-segmentary machine. (164)

Initially describing a process of the early seventeenth century, Foucault's analyses still resonate for bodies four centuries later, particularly as taken up through some feminist perspectives on bodies.

A feminist analysis of the physiques of Mills, Reinertsen, and Darling suggests that they are already significantly affected by discipline. The three women—a model, an athlete, and an actress—are lithe and toned, excellent representations of the current ideal feminine form. Clothing clings to their torsos (midriffs often exposed), bare limbs extend from tank tops and short skirts and shorts, and little is left to the imagination. Their bodies are tight, controlled, and trained for performance in multiple registers. Balsamo and Bordo read such female forms as constructions produced through Foucauldian technologies, "bodies whose forces and energies are habituated to external regulation, subjection, transformation, 'improvement'" (Bordo 91). In other words, they are already, prior to any prosthetic discussion, embodiments of docility. Anxieties similar to those of the "supercrip" circle around this pervasive representation of women's bodies, and here, I do not dismantle this reading. Outside of the inclusion of their prosthetic limbs, they are relatively stereotypical representations of women's bodies in popular culture, and as this topic is well-covered by many other scholars, I will leave this with merely an acknowledgement to such scholarship.[23] The understanding of this docile construction, however, is necessary for our next move.

Discipline and Rhetorics

What of the prosthetized body? Perhaps the ultimate demonstration of disciplined bodily control, the ultimate means of composing the body into an efficient, multi-segmentary machine, would be to literally transform flesh *into* machine, to replace potentially misbehaving natural parts with more easily controlled technologies—i.e., prosthetics. Anxieties about such replacements are often expressed in athletics, with the suggestion that if prosthetics were effective and powerful enough, people would choose to have adequately

working body parts removed and replaced with prostheses. Instead of a potentially fallible flesh leg, a runner could instead have voluntary amputations and use prosthetics even better than Pistorius', or perhaps some sort of motorized wheel. In addition to concerns of "fairness" (as addressed in the previous chapter), such anxieties suggest an underlying fear of becoming machine and therefore of losing an essential humanity based in a seemingly ineluctable relationship of flesh and free will. This anxiety requires significant unpacking, beginning with understanding the underlying perception of the relationship between body and prosthesis.

Let's begin by returning to Foucault's articulation of the process of discipline in the soldier's training:

> Discipline defines each of the relations that the body must have with the object that it manipulates.…[T]he instrumental coding of the body…consists of a breakdown of the total gesture into two parallel series: that of the parts of the body to be used…and that of the parts of the object manipulated…; then the two sets of parts are correlated together according to a number of simple gestures…; lastly, it fixes the canonical succession in which each of these correlations occupies a particular place.…Over the whole surface of contact between the body and the object it handles, power is introduced, fastening them to one another. It constitutes a body-weapon, body-tool, body-machine complex. (153)

Thus the soldier's weapon becomes an extension of his self, creating a complex between tool and flesh. The steps are direct, the actions specific and simple, the process ends with "fastening." This suggests a clean, precise, mathematical interaction, where power applied to

the addition of body and object constructs the entity body-machine, suggesting the following equation:

power (body + object) = body-machine complex

The equation is enacted through reinforcement; the practice of the simple gestures results in the new complex, grammatically represented with a dash linking the two words/parts into one. Here, the dash serves to create a linked modifier of the two terms: two separate words fastened together, yet still distinct, as opposed to perhaps a compound word (bodymachine), or a mash-up (bodchine).

This suggests, then, the language of science and technology—clear, precise, seemingly lacking in artifice or rhetoric—as prescribed by Thomas Sprat for the Royal Society of London around the same time period as the processes that Foucault analyzes in his later work. In the *History* of the Society, Sprat rails against what he saw as the ill uses of the "Superfluity of Talking," or "*Eloquence*," (or in other words, "rhetoric") by "*bad* Men" to negatively influence and distort truth.[24] The Society saw such superfluous language as detracting from the aims and potentials of science. In response to this, Sprat tells us, the Royal Society had

> a constant Revolution, to reject all the Amplifications, Digressions, and Swellings of Style; to return back to the primitive Purity and Shortness…They have exacted from all their members, a close, naked, natural way of Speaking; positive Expressions, clear Senses; a native Easiness; bringing all Things as near the mathematical Plainness as they can…. (Section XX)

This presumed purity of language remained associated with scientific discourse, influencing understandings of science and also of medicine. Of course, as rhetoricians of science helped

reveal, this discourse is most certainly rhetorical and not at all devoid of artifice.[25] As Charles Bazerman notes, "the accomplishment of scientific discourse is that it appears to hide itself" (14). These revelations notwithstanding, scientific discourse continues to influence our perception of technologies and bodies.

Entwined with this discourse is the use of a common metaphor for the body, demonstrated here and throughout history: that of the body as machine—including a heart that pumps, neurons that fire, brains that compute.[26] Norber Wiener employs this metaphor in his contemplations of cybernetics and human/computer communication, claiming, "In a certain sense, all communication systems terminate in machines, but the ordinary language systems terminate in the special sort of machine known as a human being" (79).[27] Charles M. Anderson also emphasizes the relationship between language and medicine and the influence of this mechanistic metaphor, tracing it back to Descartes and forward through the mid-twentieth century. He marks this later point as the time at which "the machine and the experimental science metaphors had become so much a part of the language of medical practice and training that they were no longer useful but optional ways of understanding the profession. They had become the only ways" (8). The metaphor as metaphor disappears, leaving behind the perception that the body *is* mechanistic; or, in Colin Murray Turbayne's terms, the metaphor as sort-crossing has become sort-trespassing, and instead of using the metaphor, we are used *by* the metaphor.

What is most relevant here are the effects of this metaphor and discourse. We can turn again to Burke, as we did in chapter two: these rhetorical frames, or terministic screens create a way of seeing the prosthetized body as one where machine (prosthesis) is simply attached to machine (body). Insert tab A into slot B, fasten, and the process is complete.[28] Scientific

rhetorics here write the body, composing, as I suggested at the beginning of this section, an underlying perception of the relationship between body and prosthesis that promulgates anxieties of the simple replacement of flesh for machine.

Words are not the only tools of construction here; visual rhetorics also strongly influence this reading. As discussed, we already see the women's bodies as controlled and conditioned; with an amputation of a leg, we also see (or imagine) a clean border of the end of the body. Or rather, if we see the leg without the complete prosthetic, we generally see a covered and contained end of the residual limb. We do not see reformed flesh, we do not see scars—we see the rounded, clean border of a prosthetic liner, or for Darling, the metal peg that extends from her wrapped residual limb. This then visually reinforces the suggestion that a prosthetic could quite simply be attached, as crudely demonstrated by Darling's prosthetic applications. Visual and textual resonances are at work in Reinertsen's ad, calling explicitly on this conflation of bodies and machines through both the visual juxtapositions and the tagline: "So agile, so responsive, it can take on any challenge." Again, the undefined pronoun "it" seems to reference Reinertsen's body and prosthetic at least as much as the car itself, pulling again on the underlying body/machine metaphor. The aforementioned YouTube mash-up of Mills' performance also demonstrates and reinforces the cultural view of "pop-able" prosthetics that quite easily attach (or, as in the video, detach).

But this interpretation of the body-machine complex is only one part of the equation; we have not yet considered the greater implications of Foucault's analysis—the purpose of the disciplined body. Here the more insidious nature of docility comes into play: a docile body, that of a student or soldier, is created for subjugation and use. Disciplinary power produces a body that behaves, that internalizes the discipline; it produces a body useful as

part of a group.[29] It is not a process of individuation but of normalization, as demonstrated in the feminist and supercrip critiques.[30] There, the concern is that one particular representation of a group (people with disabilities, women) becomes the norm to which all others comply. Implications of this then include enforced ableism and manifestations of eating disorders.[31] Here the concern, reflecting issues explored in chapter two, is that altered, prosthetized bodies become a new norm, one with which no "natural" body could possibly compete. Of course, these concerns are not unfounded, though this is certainly not what I am advocating. I am, however, arguing that, based on examples like Pistorius and these three women, the boundaries of "normal" need expanding to include variations of bodies integrated with technologies.

The other part of concern lies in the question of domination—how these docile bodies could be used. Here then, we could return to Darling, the extended embodiment of Foucault's soldiers, as a minor representation of the supersoldier often found in science fiction (and potentially not far off in our prosthetic future). Though one might worry whether Pistorius' prosthetic is fair, his running leg is a far cry from a gun. Acceptance of these enhancements, however, could then be read as steps on a slippery slope to bodies ultimately entirely mechanized and prepared for nefarious use.

Unbounded Boundaries

We can see how the presumptive reading of prosthetic bodies as docile bodies ground these prosthetic anxieties, and superficially, this reading has some weight. But by returning to Mills, Reinertsen, and even Darling, and pushing even slightly on this claim, the structure begins to fold. The concept of docility through discipline or mechanization rings false

through the experience of prosthetized bodies. For Mills and Reinertsen, the idea of becoming the ultimate normalized body simply does not pay. Though they (and others) may make claims for their normalcy, these claims are undercut by the necessity to claim this, as well as by these women's willingness to display the prosthetic itself. Again, theirs is not a process of passing, but of showing these differently constructed bodies. Mills, and most particularly Reinertsen and Darling, are breaking molds, both visually and physically, far more than they are conforming to them.

Additionally, we can question the very concept of mechanization. As shown, this plays on a notion of an easily replaceable body, and yet, despite potential analogies, a prosthetic leg operates quite differently from the soldier's weapon.[32] The weapon as a prosthetic adds function to the soldier. The soldier's body is trained to incorporate the object; his body learns his weapon as an extension of his self. But at the end of the day, the soldier puts down the object, presumably continuing to function "normally." The prosthetic of an amputee, however, encapsulates a different experience. Her prosthetic adds more fundamental function, in some ways quite literally "completing" her body, permitting "normal" physical function that might otherwise be quite challenging. But this most certainly does not happen with the ease of picking up an object. We cannot replace body parts as simply as a carburetor, removing one and snapping another in without much difficulty. Simply fitting and aligning a prosthetic, not to mention running marathons and dancing with one, can be painful and onerous. Here, we need to turn from representation to experience; narratives of prosthetic undertakings reveal aspects of these complexities inaccessible through media analysis.

Vivian Sobchack considers the "metaphor and materiality" of prosthetics through a discussion of her own prosthetic experience. Due to a recurrent cancer, her left leg was amputated above the knee; she relates her experience of receiving her first prosthetic leg about six months later, and only after "strenuous preliminary rehabilitation," recounting

> Finally…my body was ready to go through the arduous plaster casting, fiberglass molding, and microfitting of a prosthetic leg so that I could begin to learn to walk again—a fairly lengthy and complex process that imbricated both intensive mechanical adjustment and physical practice. (29)

She continues in detail, but this gives an initial indication of the many-step process, resonating with adjectives like "strenuous," "arduous," "lengthy and complex," and "intensive." These undercut the seemingly simple processes suggested by the limited representations of Mills, Reinertsen, and Darling.[33]

Steven Kurzman takes a slightly different approach, highlighting the incommunicability of finding a good fit for his prosthetic leg while theorizing the process of communication between him and Kevin, his prosthetist, in an essay aptly named "'There's No Language for this.'" He claims:

> The subjective experience of using a prosthesis disrupts language. This is especially true of new amputees, for whom an amputation is still a great shock to the body. Stumps are perplexing and delicate new body parts, and phantom limbs are somewhat disconcerting, and often painful at first. Compounding this problem, wearing a prosthesis is initially very uncomfortable. Part of your body, which was not evolutionarily designed to bear weight, is suddenly bearing your weight in motion, while your stump is encased in cloth socks and

> plastic. It is all so supremely alien that it is extremely difficult to describe the sensation at all, much less respond to the question as to whether it "feels right." (232)

Here, Kurzman thoroughly undoes the effects of the scientific rhetorics I suggested in Foucault's description, expressing the inexpressibility of experience and detailing the ways in which the body is not inherently built for this alteration. While testing a new prosthetic, Kurzman relays his thoughts: "my attention focused on my legs and the effort of thinking about what it feels like to walk and how to articulate this feeling, while Kevin alternately observed my face, legs, and body language" (228). Kurzman demonstrates that, unlike the steps required of the soldier, this is not merely a process of strapping up and running out the door, nor is it one of simply disciplining the body to work the machine. It is instead intuitive, reflective, and reflexive. The communications between prosthetist and patient require words, with which Kurzman struggles, but also other readings of the body through expression, gait, and posture. Fit cannot be achieved only through training, repetition and practice, but by trial and error; this rejects the mathematicization suggested with the soldier in the "body-machine complex."

These two examples reveal not docile bodies, but bodies quite undisciplined, bodies in process, bodies reconstituting in relation to themselves and to technologies. Kurzman relates the process of reshaping the prosthetic through series of adjustments, trying again each time until "that moment when the prosthesis just felt right and I stopped thinking about walking because it no longer felt remarkable" (229). After much work and practice and manipulation, bodies and prostheses can reach a means of working wherein movement

appears seamless, where the prosthetic disappears.[34] Sobchack reflects a similar desire in response to watching a video of amputees racing in the Special Olympics:

> As I sat there, I watched the people around me—and knew that all they wanted, as I did was to be able to walk at work, to the store, and maybe on a treadmill at the gym…. All I want is a leg to stand on, a limb I can go out on—so I can get about my world with a minimum of prosthetic thought. (38)

Sobchack does not want to win races, to dance in competitions, to save the world, but to live and work and move with relative ease, and we can infer that Kurzman is looking for a similar experience. This recalls Canguilhem's claim that, "In the final analysis it is the patients who most often decide—and from very different points of view—whether they are no longer normal or whether they have returned to normality"—be that through work, exercise, or any other personally determined standards (119). Here then, we have prosthetized bodies attempting to achieve "normal," not in the sense of docility, but of that discussed in the previous chapter. Though with goals more modest than those of Pistorius, Sobchack and Kurzman may also be Canguilhemian inventors. Despite the images presented in recent media, the interstices between bodies and prostheses are not seamless, or so cleanly seamed. We may instead see them through Haugeland's notion of intimacy, where two systems "must be regarded more as an integrated unit than as a pair of distinct components" (217).

My Re-Replaceable You

Thus far, I've examined four rather similar representations of prosthetized bodies in Pistorius, Mills, Reinertsen, and Darling. Though limited examples (all public figures, all high achievers, all with similar prosthetics), their representations offer strong ground from

which to extrapolate how we read prosthetized bodies, what complex anxieties we feel about these bodies, and how we understand the relationships between bodies and technologies. While one societal anxiety about prosthetized bodies lies, as we've seen in chapter two, in issues of "fairness," others seed in issues of mechanization, in anxieties over humans becoming machines, with all requisite implications—issues of ethics, control, and the very concept of "human." We see this play out in science fiction quite regularly—robots and cyborgs surpass and overtake humans, making us obsolete or subjugating us as slaves.[35] It is not a far leap to see the prosthetized body as one potentially mechanized in a similar manner. However, this leap is precisely that—a move that jumps over the experience of prosthetization. Yes, we can rewrite Foucault's chapter opening to read the prosthetized, constructed, constructing body, but this does not inherently create docility in Foucault's sense. Though the mediated representations of Mills and Reinertsen, and even Darling, might initially suggest this, a deeper consideration reveals the complicated experience of prosthetics. These are not merely bodies of control; though trained and capable, they are not disciplined or mechanized for use like the soldier or the car. Instead, they are bodies adapted, altered for their circumstance, for their individual need. They are not only bodies of domination, but of potentiality. They are even bodies that challenge the docile body, that explode definitions of "normal" (per Foucault's sense of normalization), that reinscribe ideas of norms (per Canguilhem's definitions). What we don't see in these representations (and do, to limited extents, in the other narratives)—the messiness, the true interactivity, the liminal space of reconceiving the relationships of lived bodies and technologies—is what we need to understand. In the next chapter, I will posit a new theoretical understanding for this space, a new epistemology from which to read bodies and technologies.

[1] Foucault *Discipline* 135. The original text (emphasis mine) reads: *Let us take the figure of the soldier as it was still seen in the early seventeenth century. To begin with, the soldier was someone who could be recognized from afar; he bore certain signs: the natural signs of his strength and his courage, the marks, too, of his pride: his body was the blazon of his strength and valour; and although it is true that he had to learn the profession of arms little by little—generally in actual fighting—movements like marching and attitudes like the bearing of the head belonged for the most part to a bodily rhetoric of honour; …By the late eighteenth century, the soldier has become something that can be made; out of a formless clay, an inapt body, the machine required can be constructed; posture is gradually corrected; a calculated constraint runs slowly through each part of the body, mastering it, making it pliable, ready at all times, turning silently into the automatism of habit; in short, one has 'got rid of the peasant' and given him 'the air of a soldier' (ordinance of 20 March 1764).*

[2] Reinertsen also competed in the TV show *The Amazing Race* in 2006, which introduced her to a large audience. As Mills story offers one representation in reality TV, I will only focus on Reinertsen in the Lincoln campaign.

[3] I recognize the challenges and potential problems of mixing analyses of real women with a fictional character, especially as that character was played by an able-bodied woman. However, my goal here is to examine the portrayal of these figures in the media, with the perspective that Mills' and Reinertsen's portrayals are also constructed for/by media. Thus here, they are all "characters" to various extents. As I've also suggested the insufficiency of only reading fictionalized characters, I will also explore how Darling differs from other such cyborgean representations.

[4] Mills' marriage to Paul McCartney could perhaps be her biggest claim to stardom, as this certainly brought greater attention to her activism and her personal story of amputation and recovery; however, her marriage was not addressed at all throughout the competition, while her performance on her prosthetic was constantly considered.

[5] All quotes from episodes of the show and pulled from various YouTube videos that were not dated.

[6] Around this same time, news broke of Mills divorce from Paul McCartney; Mills addressed this in the media, often not to her benefit.

[7] Mills did in fact lose her balance and fall in one performance, but her prosthetic leg at no time fell off.

[8] This can be seen in a video on YouTube titled "Heather Mills' leg falls off" (http://www.youtube.com/watch?v=cOgjne9oLFU).

[9] Jimmy Kimmel constructed such videos for his nightly comedy show *Jimmy Kimmel Live!*

[10] Though with less serious implications, this reflects issues addressed regarding Pistorius in chapter two.

[11] Though Reinertsen was in *The Amazing Race* and may have been recognizable to some viewers, she is not necessarily a household name.

[12] The commercial can be seen on TARracers.com.

[13] This running prosthetic is similar to Pistorius' "cheetah" legs.

[14] The print ad can be seen on the 12 March 2008 blog post "Reach higher?" by William Reagan's blog *Focus Group of One*.

[15] That is to say that the commercial makes no direct connection. The act of owning a Lincoln, an American luxury car, could be considered a "dream" as being able to afford such a car marks the owner as of a certain (upper) class in U.S. culture. This is not directly suggested here, but is part of the history of this car.

[16] There is also a complicated relationship with sexuality here. Many feminists and media scholars have critiqued over-sexualized representations of women in media (see, for example, Kilbourne and Jhally), and the sexualization and potential fetishizations of women with amputations and prosthetics can be particularly problematic (see for example Bruno, 1997; Aguilera, 2000; Lowenstein, 2002; Solvang, 2007). On the other hand, disability studies scholars and activists, like Nancy Mairs, have also critiqued how people with disabilities are regularly denied any sense of sexuality. These significant questions are grounds for their own full study, and while recognizing them is important, exploring them takes me too far afield here. I do return to address the issue to some extent in chapter four.

[17] *How* Cherry operates this gun is inexplicable as, much like the pegleg, it is simply slammed on to her body (as opposed to being attached by various wires/lead/etc.). However, realism is clearly not an overarching concern of this flick.

[18] As with other media representations, as I noted earlier, such sex-symbol discussion of the heroine of the movie, is not surprising, and is well-researched.

[19] Interspersed in this dialogue is a continuing joke about Darling becoming a stand-up comedienne; this plays to her grief and works in the context of the "camp" of the film, but is problematic and offensive; I've deleted here because of its potential offensiveness.

[20] Even if Mills' role is more commercialized, that level of dancing is quite challenging (demonstrated regularly through DWTS).

[21] I more thoroughly address aesthetic procedures in chapters three and four, though not perhaps exactly in this way – acknowledgment of procedures to create beauty, and in the conclusion, moving past traditional conceptions of beauty and accepting adaptation in varying forms.

[22] Mitchell and Snyder explain that their use of "narrative prosthesis" allows them the following:

> …to attend to the nuanced relations of literary and social responses to disability...[and] return to a history of representations to reassess our understanding of disability and thus of ourselves…our emphasis upon a narrative theory of disability rides upon the necessity of reclaiming histories of disability. We do so to help seize a more variegated and politicized disabled subjectivity for our own era. (10)

Though the figures I'm analyzing are not strictly literary, they operate similarly to literary representations. My analysis here also offers opportunities to "reassess" and "seize…variegated…subjectivity" in considering representations of disability.

[23] In addition to work by Balsamo and Bordo, consider, among others, projects like Jean Kilbourne's *Killing Us Softly* and Suh Jhally's *Dreamworlds*.

[24] All uses of capitalization and italics are quoted verbatim from *The History of the Royal Society* unless otherwise noted. I have modernized the spellings.

[25] See significant analyses of scientific rhetoric in works by Gross, Latour, and Latour and Woolgar.

[26] For discussions of the impact of metaphor in the creation of meaning, see Fahnestock, and Boyd's and Kuhn's essays in Ortony's *Metaphor and Thought*. Boyd is particularly useful here in his explication of "theory-constitutive metaphors," such as those used by cognitive psychology in relating functions of the brain and thought to concepts in computer science. For Boyd, these metaphors "represent one strategy for the accommodation of language to as yet undiscovered causal features of the world," or a means of using and modifying terminology, "arranging our language so that our linguistic categories 'cut the world at its joints'" (490, 483). For Boyd, these metaphors provide epistemic access to physical reality, and so become foundational in the scientific hypothesis or theory, rather than just offering a linguistic comparison. While Kuhn, in an accompanying chapter, takes issue with many aspects of Boyd's theories, on this point he agrees with Boyd (538).

[27] It must be said that Wiener's use of this metaphor is not quite this simple. First, he extensively explicates the analogous relationship between humans (and particular organs) and machines, carefully considering how and where the analogies best apply. Second, as much as he examines the human as machine, he is also interested in the machine as human, an inversion of the metaphor. For example, on p. 57, while still using the term "mechanical," he is acutely aware of the complexity of human physiology, suggesting at the least a highly complicated machine that as of yet has no mechanical equal. On 65-66, he recognizes "just criticism" from physiologists and psychologists who "prefer not to make use of the machine comparison."

[28] For Foucault, the weapon *is* a prosthetic, a completion of the soldier's body/purpose, much as the prosthetic leg "completes" Mills, Reinertsen, and Darling's bodies.

[29] Garland Thomson addresses this in her discussion of Emerson's liberal individualism and "The Proper Pauper," the relationships between American ideologies for work and autonomy. Here, she notes, a disabled body "has the potential to inspire with its irreverent individuality and to threaten with its violation of equality" (44); a well-disciplined disabled body would be one corrected to function individually and productively in the workforce.

[30] Notably, then, this is not the idea of norms per Canguilhem.

[31] This greatly truncates Bordo's argument of the expression through women's bodies of social expectations of women (e.g., women who develop agoraphobia upon marriage).

[32] Obviously Darling's leg is in fact a weapon, though her process of acquiring and (presumably) acclimating to the prosthetic is still different from that of a soldier. Notably, she is not employed here by the government, but acting independently and out of immediate necessity. That her boyfriend provides this leg complicates her independence, but still, she willingly accepts her prosthetization, continuing to use it even after her boyfriend has been killed. This suggests an autonomy perhaps different from that of a soldier.

[33] Of course Mills and Reinertsen may have (had) very similar experiences with their prostheses, we just are not made privy to this in the context of their TV appearance and ad campaign.

[34]This, of course, is not a new *constant* state of seamlessness—as with all other aspects of bodies, this relationship is constantly renegotiated, not only with new/different prosthetics, but with all other

differing conditions of bodies, environment, mood, and so on. I explicate this in greater detail in chapter three.

[35] *Robocop*, *I, Robot*, and *The Matrix* are only a very few examples of movies that represent this.

CHAPTER FOUR

BREAKING BOUNDS

...Here personal contingency crosses with contingency in the history of technology. Had I lived earlier, I would be dead; later, I would be surviving in a different manner. But "I" always finds itself caught in the battlements and gaps of technical possibilities. This is why the debate I saw unfolding, between those who consider this to be a metaphysical adventure and those who would see it as a technical performance, is vain: it is a matter of both, one in the other.

Nancy, *L'Intrus*

"Life isn't about finding yourself. Life is about creating yourself."

George Bernard Shaw

We are made of the stuff of stars[1]

Machine-gun legs, dancing starlets, mechanized marathoners, and the super-abled: in chapters one and two, we have considered the questions of prosthetics through several problematic (and potential) readings of bodies. Of course, these make barely a drop in the sea of prosthetics, experientially, theoretically, historically, and even contemporarily. Nonetheless, these examples leave us with a destabilization representative of broader concerns for bodies and technologies. In analyzing the figures of Heather Mills, Sarah Reinertsen, and Cherry Darling, as well as the surrounding rhetorics and theoretical

constructions, we have exposed the problems with the metaphor of the mechanical body in understanding the prosthetized body. With Pistorius, we have seen how the dis/super-abled construction creates a fissure in our bodily labels, and, as with the women above, engenders somatic anxieties. I want to return again to Canguilhem's question: "To the extent that living beings diverge from the specific type, are they abnormal in that they endanger the specific form or are they inventors on the road to new forms?" (141). I argue, of course, that prosthetized bodies do not endanger but invent, and that to understand these bodies, what we need is not a lock-down on the definition of normal and "naturally correct," but rather a rethinking of the configuration of bodies and technologies. To do this, we must turn to our very understanding of bodies, or, more precisely, that which disrupts such understandings.

Carl Sagan tells us, "The Earth, and every living thing, are made of star stuff." Though in one turn a romanticized notion of our relationship with the cosmos, this serves also as an argument of constitution, claiming the similarity of matter between all objects of our universe. If we are all "star stuff," determining the differences of self and other becomes tricky. For Sagan this is the point—laying common (chemical) ground connects all, giving us (humans) an incentive to know our world, to be mystified and romanced by our star-like being, to be dazzled and enriched by science. But, as we've seen, these boundary-crossings also create anxieties. Perhaps the fundamental question of the condition of humanity is that of boundaries: Where do "I" stop and others begin? Or, more broadly and yet specifically, "who/what am 'I'?" This question is approached in countless ways, from biological distinctions of species, to distinctions of national and ethnic identities, to interrogations of "othering" as political action, to questions of chemical form and composition, to Descartes' meditations, to Haraway's cyborgs. Of course, giving even a brief overview of this question

requires the history of much of philosophy, not to mention significant scholarship in other fields. Instead, I want to maintain a tight focus on the topic at hand. I argue in the end of chapter three that we must consider the experience of prosthetics, the liminal spaces between bodies and technologies. Let's turn back to one of the final stories there: Stephen Kurzman's discussion of the difficulties of communication when adjusting a new prosthetic. The process for him ended at "that moment when the prosthesis just felt right and I stopped thinking about walking because it no longer felt remarkable" (229). What is happening in that moment, in the moments before? How do flesh and technology come together in an unremarkable way? This is precisely the moment to consider, drawing our focus quickly to that which I see as most relevant—the boundaries of body and world. But before considering what can happen when we add to the body, we need to examine what can happen when we take from the body.

Phantom Feelings

> It has long been known to surgeons that when a limb has been cut off the sufferer does not lose the consciousness of its existence. This has been found to be true in nearly every such case. Only about five per cent. of the men who have suffered amputation never have any feeling of the part as being still present. Of the rest, there are a few who in time come to forget the missing member, while the remainder seem to retain a sense of its existence so vivid as to be more definite and intrusive than is that of its truly living fellow-member.
>
> A person in this condition is haunted, as it were, by a constant or inconstant

> fractional phantom of so much of himself as has been lopped away—an unseen ghost of the lost part, and sometimes a presence made sorely inconvenient by the fact that while but faintly felt at times, it is at others acutely called to his attention by the pains or irritations which it appears to suffer from a blow on the stump or a change in the weather. (Mitchell 565)

In this extended quote, S. Weir Mitchell, credited with the first use of the term "phantom limb," reports on the condition in Civil War veterans. As Mitchell notes, phantom limb syndrome may result after an amputation of a limb; though the physical limb is gone, patients continue to feel various sensations in and from the space the limb once occupied.[2] These most frequently manifest as types of pain, like stabbing or burning; other common sensations include movement of the limb, consciously or independent of the patient's intensions; mispositioning, as though the phantom limb is twisted into unnatural positions; and telescoping, where the limb feels shorter than it should, even retracting entirely to where only the phantom hand seems to extend from the residual limb.[3] Countless anecdotes and studies from at least as early as the sixteenth century report this phenomenon, though this first use of the term did not occur until the 1871. Since that time, understanding the cause of these sensations has often been as mysterious as the phantoms themselves. Mitchell suggests above that the condition is a psychological issue, one of "consciousness," of remembering and forgetting the flesh that was no longer there. However, he also posits physical explanations, describing the effects on the phantom limb of "irritating the nerves in its stump" (566). Perhaps most telling, he later writes:

> The explanation of these very singular symptoms is by no means easy. It seems probable that our knowledge of the whereabouts of an extremity, and of

> what it is doing, depends upon a host of sensory impressions, some of them visual, some derived from the muscles or joints, and some from the surfaces of the skin. (567)

Since the nineteenth century, significant changes in understanding the medical body have emerged within neurology and through the development of nuclear medicine and advanced radiological techniques. [4] These have given us new abilities to see inside the body, to track motion and pain and emotion through the nervous system, to understand proprioception, and to study phantom limb syndrome with different sets of tools and knowledge. Despite this, contemporary discourse on the subject remains remarkably similar to Mitchell's. In 2007, an article by Chahine and Kanazi in the *Middle East Journal of Anesthesiology* notes, "Phantom limb syndrome continues to be a difficult condition to both understand and treat." A March 2009 article by Black, Persons and Jamieson in *The Journal of Family Practice*, referencing guidelines established by the US Department of Veterans Affairs and the Department of Defense, advocates a multidisciplinary approach to treating phantom limb pain, including evaluative management, desensitization, psychotherapy, and pharmacotherapy. These approaches treat the patient physically and psychologically, individually and experimentally; no single course of treatment can be prescribed for the majority of patients. Again, this suggests the continued difficulty of understanding and treating phantom limbs.

It seems, then, that we still do not completely understand this extension of the self into space. Phantom limbs are defined as syndromes or conditions, as aberrations to be treated and fixed. These definitions presume a fleshly integrity demarcated with strict boundaries—if the limb is not there, we ought not feel it. Treatment presumes a restoration of that integrity. And yet, despite more than a century of study, we have few clear solutions for or means of

such restorations. Fundamental questions remain: How can the absence of body be so very present? How does our perceptual field extend beyond the limits of our flesh? Perhaps the problem lies not in the experiences of phantom limbs, but in these definitions.[5] I have argued in previous chapters (and will again shortly) that prosthetics destabilize our sense of a "whole" or "natural" body through their integration with and addition to flesh. Phantom limbs also destabilize this understanding of the "whole" body, though here through subtraction and remainder; sensation perseveres despite the removal of flesh. The body cannot be solely defined by its visual, seemingly distinct boundaries. We need different definitions, in both meanings of words, and these boundary-lines. Let's turn then, to a phenomenological perspective: Merleau-Ponty's conception of the body-world.

Merleau-Ponty

How do we conceive of the body? From a rationalist perspective, the body is merely a conduit between the world and the mind; the mind, imbued with intuition and *a priori* knowledge, is how we fundamentally know the world. From the empiricist view, the mind is a *tabula rasa*; knowledge is developed *a posteriori*, a result of experience and sensation imprinting the world upon us. Though these are extremely broad statements of two major philosophical movements, we can see the underlying conception of the body in each is similar: the body is at best separate from and secondary to the mind. It is a filter or tool through which to create or confirm our knowledge of the world—that world which is also separate from ourselves. These separations, between mind and body, between self and world, suggest that the world is implicitly and objectively knowable.

Merleau-Ponty intervenes upon these separations, deeming rationalism and empiricism

both insufficient ways of knowing. Building from Husserl's work, Merleau-Ponty complicates these boundaries, positing a complex phenomenological conception of our experience of the world based on perception. He writes:

> The theory of the body schema is, implicitly, a theory of perception. …we have found underneath the objective and detached knowledge of the body that other knowledge which we have of it in virtue of its always being with us and of the fact that we are our body. In the same way we shall need to reawaken our experience of the world as it appears to us in so far as *we are in the world through our body, and in so far as we perceive the world with our body*. (239, emphasis mine)

This final italicized phrase, emphasizing the "through" and "with," is the crux of Merleau-Ponty's argument. Our body is not separable from our experience of our body, nor is the world at large separable from our experience of the world through our body. His rumination on the hand presents an extended contemplation and example of this (106-107). Interiorly, within our own bodies, we experience the "handness" of our hand—I feel my hand's movements within that hand, experience relief if I stretch it, pain if I smack it against something. I also experience my hand "separately"—I see it at the end of my arm, fingers typing diligently; I can touch and feel that hand with my other hand, trace the ridges of my knuckles, the tendons stretching to the wrist. If my hand falls asleep, I feel it interiorly as foreign, disconnected, numb (or not-felt); my exterior experience of that hand remains the same, seeing and feeling the now-numb-hand in the same ways as before. But for Merleau-Ponty, all of these ways of knowing are only one way; I know my body through my experience of my body. This experientiality extends to the world; perception is our (at least

first) way of knowing the world. Our body extends through our senses, experiencing the world as we experience our body. Merleau-Ponty writes:

> The sensor and the sensible do not stand in relation to each other as two mutually external terms, and sensation is not an invasion of the sensor by the sensible.…in this transaction between the subject of sensation and the sensible it cannot be held that one acts while the other suffers the action, or that one confers significance on the other. (248)

Thus, for Merleau-Ponty, strict designations between body and world are insufficient. This is not a condition of subject/object, each distinct and beside, yet interactive with, the other. "Confer" is an interesting verb here, meaning both to bestow and to exchange; indeed neither is what he is on about, as both definitions maintain this separation, necessitating subject/object, referring back to claims of empiricism. Merleau-Ponty posits our body as being "not primarily *in* space: it is of it" (171). Here, to be *of* space extends beyond the "star stuff" of chemical composition to our sensate relationship with the world. Body-world, as a continuum, better expresses the complex relationship of existence, the interactive, interdependent indistinctions and distinctions of self and non-self.

In practice, returning to our previous example, phantom limb syndrome perhaps best represents this body of space. Merleau-Ponty, like Mitchell and others, examines the often-cited potential root causes of this phenomenon: psychology and physiology. Merleau-Ponty too notes that physiologically, the experience of the phantom limb might merely be misfiring neurons, nerves damaged in the process of trauma and amputation. But interventions to resolve the bodily or anatomical problems, as shown historically and in recent research, do not reliably eliminate the phantom sensations, or even just the associated pain. Thus,

physiological explanation is not enough. Merleau-Ponty also articulates how psychological factors can affect the experience, as the desire for a once-again whole body could project the sensation of that missing part, with memory and/or lack of acceptance of loss psychosomatically holding that limb in place. Again, a couple centuries of study has continually revealed that this hypothesis is also insufficient as a sole cause of the phenomena. This phantom is not a phantom of the imagination; patients are not delusional, nor do they think the missing limb is actually present. However, a third potential exists, as physiological and psychological causes seem not to be mutually exclusive. "Hybrid" theories abound, and Merleau-Ponty particularly notes those asserted by neurologist J. Lhermitte. Merleau-Ponty finds validity in this hybridity as "a statement of the known facts" though rejects it as "fundamentally obscure" (89). This hybridity still operates from a Cartesian dualism, not privileging mind over body, but still implicitly depending upon two distinct entities interacting. However, within theses frames of understandings of mind and body, no linking point exists for the two to "form an articulate whole."

By reconsidering the potential purpose of use of the phantom limb, here, again, Merleau-Ponty puts forth his conception of being-in-the-world as a meditation on and a correction to this dualism of body/mind, physiology/psychology:

> To have a phantom arm is to remain open to all the actions of which the arm alone is capable; it is to retain the practical field which one enjoyed before mutilation. The body is the vehicle of being in the world, and having a body is, for a living creature, to be intervolved in a definite environment, to identify oneself with certain projects and be continually committed to them. (94)

The body extends beyond the seeming limits of the body, the phantom arm remaining "open

to all the actions" of arm-ness. But if the phantom arm is open to this, then the actions, the "practical field" are not beholden to the arm alone. Instead the body is intervolved, wound through with world. It is here, within this intervolvement, that I see the potentiality for understanding the relationships of flesh and prosthetics, of bodies and technologies.

A later example gives further weight to and ground for this claim. In explicating the relationship between motor habits and perception in the body, Merleau-Ponty offers the example of using a stick instead of vision to find one's way around:

> Once the stick has become a familiar instrument, the world of feelable things recedes and now begins, not at the outer skin of the hand, but at the end of the stick. […] The pressures on the hand and the stick are no longer given; the stick is no longer an object perceived by the blind man, but an instrument *with* which he perceives. It is a bodily auxiliary, an extension of the bodily synthesis. (175-76)

We've moved away from the phantom limb here, but the arm-hand-stick-world continuum actively demonstrates intervolvement. The stick, a tool external to the body, is here wound through the body-world. It is a pseudo-prosthetic for sight, not precisely replacing the function of eyes, but actively extending the body's perception through space, creating sensation, communication through body and world. We see this alteration in body-world perception and intervolvement as well through Merleau-Ponty's example of the dung beetle.[6] After amputation of phalanges, the beetle can immediately continue walking, though now "the movements of the stump…and those of the whole body…represent a new mode of locomotion, a solution of the unexpected problem posed by amputation" (*Structure* 39). The beetle establishes a new "functional equilibrium" that adapts to changing surfaces, utilizing

the stump(s) as needed, or not. The beetle's amputated phalanges establish a bodily synthesis not with an auxiliary (like the stick), but directly with the ground. While not reducing the human experience of amputation to that of an insect, through this example, we can again see the potentialities of intervolvement.

It is a small step, then, to extend these intervolvements through the experience of medical prosthetics used after an amputation. Let's return to Kurzman once again, to "that moment when the prosthesis just felt right and [he] stopped thinking about walking because it no longer felt remarkable" (229). Prior to this point, he struggles with the sensations of the new leg not fitting properly, with feelings of pain and discomfort, feelings difficult to describe with words, but that are communicated with his body. Kurzman relates how the prosthetist keenly observes the process, generally knowing before Kurzman even speaks that the prosthetic is simply "not right"—Kurzman's facial expressions, as well as his way of walking and holding himself, reveal these sensations. But once the adjustments are right, once Kurzman becomes comfortable, his gait and expression change; he ceases to struggle with this new, other leg because, practically speaking, it ceases to be other. He stops perceiving distinct boundaries between his body and the world; his prosthetic acts similar to but more extensively than Merleau-Ponty's stick, embodying the "practical field" left by amputation.

A note on terminology before continuing: I have so far dealt only with the technology of medical prosthetics used after amputations, and only with prosthetic legs at that. Of course, "prosthesis" does not define only this. First used in 1550, according to the OED, to describe the process of adding a letter or syllable to a word, it became applied in medical terminology in the eighteenth century, describing a replacement for missing or defective

parts. “Prosthesis” has since come to be used much more broadly, describing anything from artificial limbs, to glasses, to pacemakers, to cell phones, to pharmaceuticals, to language, to objects and concepts between and beyond. I do not fully reject these other definitions, and see the relevance of these, as well as other technologies, in my broader claims. However, I will also (to certain extents) grapple with them, though for the most part, I will continue to focus in this work on medical applications, narrowing that exceptionally broad lens.

Merleau-Ponty’s phenomenological conception of body-world thus provides grounds for my argument, means of understanding how our bodies (can) operate with technology. A prosthetic, then, from a stick to a bioengineering marvel, at its greatest potential, becomes an extension of our own body, a participant in/through the body-world continuum. The couplings of flesh and prostheses are not merely acts of linking inert, mechanistic parts. Such presumptions, as I addressed in chapter three, are affected by scientific rhetorics: “A” (prosthesis) is not cleanly added to “B” (body) to create prosthesis+body. This claim demands not only absolute boundaries of flesh and technology, but inactive stabilities of both sides of the equation; mathematical and mechanistic metaphors fail here. Prosthetics in particular, as I also argued in chapter three, are also not only external interventions used to “fix” the body to an arbitrary norm determined by a fleshly standard—technological agents of control that act on and discipline flesh. This frame gives agency to the technology, which then remakes malleable, misbehaving bodies (or, inverting the previous example, active, unstable flesh) into mechanistic, docile bodies.[7] Instead, prosthetics are particularly complex intervolvements of the body with the world. They actively engage with bodies, operating, as Merleau-Ponty’s stick and Kurzman’s experiences demonstrate, as extensions of perceptual fields. This intervolvement is not a simple exchange or replacement; even though Kurzman’s

narrative concludes with the right fit, that is not the end of his story. In that episode, in those moments, the continuum shifted to a full intervolvement, his body and prosthesis working seamlessly and effortlessly. But change the terrain, the condition of the residual limb, the status of another body part that might affect gait, and the continuum shifts again. Active engagement means constant renegotiations of situated body-worlds. Like Merleau-Ponty's dung beetle, we adapt situationally, adding, altering, removing, and utilizing prosthetics and bodies/flesh as needed.

With this, the conception of a "natural" body, existing in opposition to environment, technology, non-self, becomes perceptually slippery. Prosthetics destabilize these boundaries, standing as demonstrations of Merleau-Ponty's claims—and here, for a moment, we can read the term "prosthetic" more broadly, again following the example of Merleau-Ponty's stick. Any "object" (or aspect of the world) can become part of the body's perceptual field, can become intervolved with the body, and such "objects/world" constantly do so, from utensils used for eating or writing, to our cars when driving (and so on and so forth). Biomechanically advanced prosthetics in particular, such as the myoelectric arm, explode these seeming boundaries of "natural" and technological even further. In these technologies, the presumption of bodily boundaries dispelled by Merleau-Ponty's phenomenological musings become quite literally breached — wires and sensors extend through flesh, human and machine communicate with electrical signals indistinguishable from each other, and boundaries become even more negligible. If we come to see the body as situated within the body-world continuum, the norms for the relationships of bodies and technologies have room to expand. There is no ("natural") body separable from ("technological") world, but only shifting continuums of intervolvement. The presumed norm of the "natural" body is built on

false premises of absolute boundaries.

But if anything can be prosthetic in this way, we risk a level of generalization that becomes as critically problematic as the "natural" body, where everything and every being is just "star stuff" without differentiation. This is not what Merleau-Ponty is getting at, nor what I am advocating by destabilizing "natural." While I'll address this problem more fully later, for the moment, to construct a frame around such considerations, we might turn to Haugeland's concept of intimacy in considering mind-body-world systems. He works with an example of an ant walking on the beach, suggesting when, how, and to what extent to consider these two things together.[8] If we are interested in a biological system of the ant, then the beach is of little concern. However, if we want to understand the ant's path, and if, he writes:

> …there is constant close coupling between the ant and the details of the beach surface, and if this coupling is crucial in determining the actual path, then, for the purposes of understanding that path, the ant and beach must be regarded more as an integrated unit than as a pair of distinct components. (217)

These "integrated unit" and "close coupling" can also be read as intervolvements, active engagements similar to those of Merleau-Ponty's dung beetle. For Haugeland, understanding the relationships between body and world must happen with specific foci, not in absolutes. He notes that determining "*which* close interactions matter, when considering the scope and structure of systems, depends fundamentally on what we're interested in" (216-17). This allows us then to consider norms of bodies and prostheses outside of a vacuum, outside of the Foucaldian normativity positing the "natural" body (i.e., that which is constructed to be naturally correct); instead, returning to my arguments in chapter two, we also have a

resonance with Canguilhem's malleable norms. Canguilhem too emphasizes the role of context, arguing that, "Taken separately, the living being and his environment are not normal: it is their relationship that makes them such" (143). Determining what is normal happens by considering how particular traits or characteristics of beings operate in relation to their world; what is pathological in one context, in evolutionary terms of "stability, fecundity, variability of life," can be normal or superior in another (Canguilhem 144). While I am not making an evolutionary argument about prosthetics, this frame, together with the theories of Merleau-Ponty and Haugeland, offers a constellation for determining malleably normative bodies: we must consider the active engagement of prosthetics and bodies within continuums of body-world intervolvement and in the context of specific interests and environments.[9]

Let's return then to Oscar Pistorius' Olympic case.[10] In the context of that competition, what we are interested in is whether or not Pistorius' prosthetics are enhancements, giving him an advantage over other athletes' (presumably) "natural" bodies. Recall that Pistorius' experiences of ambulation on legs have only ever been through prosthetics, and that he has decried categorization as disabled, suggesting instead that he is simply different, as he "do[esn't] have any legs."[11] It would seem, then, that his norm—sans biological legs, with prosthetics—in the experience of motion (running), is precisely Merleau-Ponty's intervolvement of body-world. We might also note, though developing it fully at this point would take us too far afield, that there was no discussion of any technologies used by the runners against which Pistorius was compared—technologies potentially including diet, training, apparel, or track shoes; these are all presumed to be part of the norms of running. In this frame, his prosthetics are not simply enhancements, no more so than any other "intervention" or technology. Disbarring Pistorius from competition because he is

"unnaturally" enhanced here becomes an obviously arbitrary and ungrounded position.

Now, as I argued in chapter two, creating an equal playing field for the Olympics, for example, is not inherently problematic. Creating one based on a mythic "natural" body is. Operating in the same frames offered through Canguilhem's and Haugeland's ideas, prosthetics could potentially be "enhancements" in certain contexts, but they ought not be unquestionably judged as such by their appearance (meaning both their use and their visual design). Thoughtful, carefully weighed rules must consider these other potential "interventions." But here again, we reach a limit.

Building an Historicity

Though fruitful theoretical ground for beginning, Merleau-Ponty's phenomenology, even when contextualized with Haugeland and Canguilhem, contains one glaring problem, as I suggested above. I have from the start contended that my arguments and claims be historically situated—and yet Merleau-Ponty's theories are in fact ahistorical. Phenomenology intercedes on earlier epistemological claims of knowing the self and the world by arguing that the underlying question of theories of rationalism and empiricism is wrong. Husserl argues that one cannot know what is "real" outside of one's self; one can only perceive, and perceive perceiving the world. Phenomenology, then, is not a theory of knowledge, but a practice of description, operational without historical boundaries. It is the individual's perceptions and experiences that are to be weighed, considered, and interpreted.

We could also consider prosthetics to be ahistorical not in terminology, but in use: the world's oldest prosthetic, a toe found in an Egyptian mummy's tomb, dates to 1069 to 664 B.C. (Choi). If we turn to include diet, vitamins, and shoes as technological interventions on

the body, to consider the broadest possible definition of "prosthesis," why, then, insist on a historicization? These "things" have been around, have been happening, have been in use, for millennia. One approach to understanding them, then, would be to end where we are now, with some frames for interpreting the perceptual experiences in specific contexts and a reminder that this is really nothing new—the prosthetics may be different, but the experience is fundamentally the same.

However, I do not think this is the case. An ahistorical phenomenology suggests that our individual experiences are somehow precisely that—*individual*, i.e., outside of political, rhetorical, social influences. That claim works against much of what I've argued in the first two chapters, with invocations of critiques by feminist/gender scholars and rhetorical theorists—particularly works in rhetorics of science and medicine (Latour, Otony, Bazerman), and those of Burke, Butler, and, of course, Foucault.[12] Foucault's archeological and genealogical approaches give ground for interpreting not only the discourses but the practices that shape the histories of who we are. Following this, I insist on a historically situated argument precisely because of the stories I have already discussed, because of their content and because of their timing, in degree and in kind. These stories are not just of individual experiences, but of the discourses and practices, the social structures in and through which they are created and understood. A fundamental part of these structures now lies in relationships with technologies that have infiltrated every aspect of our lives, in their ubiquity and their intervolvements. In Haraway's words, "our machines are disturbingly lively, and we ourselves frighteningly inert" (*Simians* 152). I'll discuss this further in a moment, but simply put, almost every aspect of life is now intertwined with technology to an extent and type unheard of just a couple decades ago.[13] With this shift have come questions

and anxieties, of which Oscar Pistorius, Heather Mills, Sarah Reinertsen, and even Cherry Darling, as I've argued, serve as representative examples. Their technologically advanced prosthetics and what they do with them demonstrate the kinds of changes, while the attention paid them suggests their impact on society and society's curiosity about the meaning of these changes.

These experiences and structures demand a new perspective for understanding—one that integrates the experiential/phenomenological with the historical, that puts Foucault and Merleau-Ponty into conversation. Though potentially objectionable from some philosophical perspectives, this move is not an antithetical one. While Foucault does not share, and is even critical of, the phenomenological framework, he also cannot operate without intervolvements of body and world; this is fundamental through both juridical and modern power and the ways that these act on bodies. Discipline in biopower particularly enacts such intervolvements—consider again the example of the soldier's training with his weapon, as I addressed extensively in chapter three.[14] While Merleau-Ponty's work situates the body as the condition of our knowing, a first perceptual ground from which we then create understanding, his perspective seems to require a historical extension. Within that, I'm interested in employing his larger ontological claims of intervolvement, and considering how his specific commitments can be historically situated. This, then, serves as a limited centerpiece. Also, while his claims may operate ahistorically, we should note that he builds these in part from contemporary studies in psychology and biology. I will follow this, considering work in neuroscience and prosthetics, and adding a Foucauldian lens through which to see this historically-specific prosthetized body. Let's begin this move by returning to Foucault's analysis of the history of medicine.

Neurology and the Medical Gaze

Foucault tracks the history of the medical gaze in *The Birth of the Clinic*, noting how changing perceptions structure different understandings of the medical body:

> At the beginning of the nineteenth century, doctors described what for centuries had remained below the threshold of the visible and the expressible, but this did not mean that, after over-indulging in speculation, they had begun to perceive once again, or that they listened to reason rather than to imagination; it meant that the relation of the visible and invisible—which is necessary to all concrete knowledge—changed its structure, revealing through gaze and language what had previously been below and beyond their domain. (xii)

Foucault's analysis notably emphasizes changes, moving the history of medicine away from a narrative trajectory of "progress" to one of shifts in perception. In the anatomo-clinical gaze of the nineteenth century, doctors "see" the body, literally and figuratively, in new ways, and the body becomes a semiotic system to be interpreted in relation to pathology and death.[15] But this perceptual shift, rather than revealing the "truth," is instead simply another means of creating understanding in a history of such means. I want to pick up this nonlinear perspective to consider the contemporary gaze in medicine. Today, expansions in nuclear medicine and diagnostic radiology change our perspective. This gaze has again extended, revealing through imaging what was previously "below and beyond," particularly in the brain. While Merleau-Ponty theorized the phenomenology of perception, neuroscience began to show it. I want to return here to the realm of the phantom limb and consider the

relationship of some of this scientific research to the philosophical ground.

In 1950, Penfield and Rasmussen charted the somatosensory cortex, mapping the location of bodily sensations on the brain. By stimulating certain areas of patients' brains with electrodes and asking the patients what they felt, they found a thin ridge along the crevice of the two hemispheres of the brain that correlated with specific parts of the body.[16] A corresponding caricature, known as the Penfield homunculus, visualizes this map in a figure of a man with exaggeratedly large hands, lips, tongue, and face; these areas of the body are exceptionally loaded with nerves, and take up more space in the somatosensory cortex. Particularly interesting is that the body surface represented in the cortex does not correspond directly to the location of these body parts. Starting at the top of the brain, the body is represented approximately as follows: genitals, foot, leg, trunk, shoulder, arm, hand, face, lips, tongue. So, the genitals and the face are both represented on opposite ends, instead of being situated on/near the trunk of the body. This base of knowledge becomes vital in tracking sensation and motion in relationship with phantom limbs, particularly when combined with imaging technologies such as Magnetic Resonance Imaging (MRI), Magnetoencephalogram (MEG) and Positron Emission Tomography (PET). These scans all produce detailed images of the body and are particularly useful in determining structures and functions in soft tissue; they are of the most significant changes in the contemporary medical gaze. Much as opening the corpse (in coordination with other frames of knowledge) changed the medical body in the nineteenth century, creating image representations of the inside of the human body while it is still alive and active again dramatically changes the structure of the relation between the visible and the invisible, this time for the mid-twentieth century.

Mapping the brain, in particular, has significant effects on understanding sensation and

perception, the grounds of phenomenology. What is perceived is now moved further from the psychological into the physiological. While on one hand this (potentially) recuperates the body from the Cartesian split, since much of the human experience becomes attributed to physical structures (nerves, cells, hormones), this also gives primacy to the brain as the "control center," again invoking mechanical and computer-based metaphors of/for the body.[17] These metaphors are realized as well in *how* we see this mapping—through constructed and projected images, the representations of the brain. We experience the mapped brain less within the physical brain itself than in the visualizations of that structure, and the interpretations of those visualizations. Though the construction is most obvious in imaging technologies, Penfield's homunculus serves as an early example. There is not literally a homunculus visible on the physical brain—again, this is a representative visualization of what Penfield discovered through direct stimulation of regions of the brain.[18] Thus, the technology quite literally shapes the gaze, constructing both how and at what we gaze. The kind of visualization (and metaphorization) now possible creates a very scientific body, one subject to testing and proof of a higher certainty, as is often assumed with greater visibility. If we can see it, we can measure it, we can know it.

V.S. Ramachandran, in the introduction to his book on the "mysteries of the human mind," notes:

> Indeed, we can pick up where Freud left off, ushering in what might be called an era of experimental epistemology (the study of how the brain represents knowledge and belief) and cognitive neuropsychiatry (the interface between mental and physical disorders of the brain), and start experimenting on belief systems, consciousness, mind-body interactions and other hallmarks of human

behavior. (3)

Again here, the roles of visualization and interpretation are indispensible. While one might dissect the heart, and, in studying its structure, learn how it works, one cannot do the same with the brain. Though physically examining this organ certainly reveals information about structure and function, or health and disease, the functions of the brain occur on at least the molecular level, through electrochemical and biochemical transmissions—in other words, beyond what is visible to the human eye. Thus, seeing the physical brain will not reveal how it "represents knowledge and belief;" this is only (if ever) possible through this contemporary technological gaze. The representation of Ramachandran's "experimental epistemology," then, is dependent upon two turns of representation: first in how we (technology) represent(s) the brain, and second in "how the brain represents knowledge and belief," or how we interpret the representation of the representation. Trained professionals must read these scans, making sense of the images, drawing connections between that which is physical and that which is "mental" or emotional. If we return to discussions of metaphor in previous chapters,[19] we then enter a circular logic, where metaphors of the body-as-machine or technology can shape how a technologically-created image of the body is read; in turn, these readings reinscribe the body-as-tech metaphor, and the metaphor as metaphor begins to disappear. It is this technological gaze that now allows (what we can assume to be) scientific and biological experimentation on aspects of humanity—as Ramachandran notes, "belief systems, consciousness, mind-body interactions and…human behavior"—previously left to philosophy and the social sciences.

Now, I do not mean to pigeonhole all neuroscientists and doctors (or any other scientists, for that matter) as researchers attempting to establish such strict notions of the

body. Again following Foucault, we must remember that power/knowledge is not knowledge enforced by the expert onto society, but is a non-reducible interaction created and reproduced throughout society. Thus, as I argued in chapter three, this mechanized, scientific conception of the body is quite ubiquitous amongst experts and the public. And while problematic in some regards, it, like other historical frames for understanding the body, is not inherently wrong. Nor is it as static as we might assume.

Ramachandran demonstrates this in his studies of phantom limbs, two examples of which (discussed extensively in his 1998 article in *Brain* and his book) are particularly illustrative. [20] First is the case of Tom Sorenson, a seventeen year old whose arm was amputated as a result of a car accident.[21] He experienced a "telescoped" phantom—the arm of the phantom limb was shortened, and he felt his phantom hand extend directly from his residual limb. Ramachandran became acquainted with Tom after the malleability of the body map of monkeys was discovered.[22] Tim Pons and his research team studied monkeys who had had the sensory nerve fibers of one arm severed from the spinal cord; the paralyzed arm, then, did not send messages to the brain. Researchers expected that the corresponding area of the somatosensory cortex would simply not fire when the arm was touched. However, when they touched the monkey's face, the regions for the face *and* the (paralyzed) hand became active, suggesting that the brain remapped post-paralysis. Ramachandran wondered if this phenomenon would extend to humans and began working with Tom about a month after Tom's amputation. Tom was told little about Ramachandran's hypotheses, so as not to influence the study. Once in Ramachandran's lab, he was blindfolded while Ramachandran brushed a Q-tip across various points on his body, and was asked to describe what he felt. As the Q-tip brushed different places along Tom's jaw, Tom reported feeling the sensation both

in the actual space along the jaw as well as in different fingers of his phantom hand. He also noted the double sensation along the top of his amputated arm, near the shoulder.

This experiment revealed that adult human subjects responded similarly to the monkeys in Pons' research. If Tom feels his phantom hand when areas of his face and upper arm are stimulated, this suggests that his somatosensory cortex has reorganized to account for the loss of his arm. Recall the somatosensory map: the locus for the hand is between the loci for the face and the arm. When Ramachandran performed MEG studies on other arm amputees, the neuroimaging confirmed the perceptual reports; the Penfield map had changed, and the area for the hand had "been invaded by the sensory input from the face…and upper arm" (31). Tom's account, combined with these MEG studies, confirmed Ramachandran's hypotheses. Contradicting the long-held belief that the adult brain was "fixed," Ramachandran demonstrated that the brain remains plastic into adulthood, capable of adapting to physical changes in the body. In the words of Ramachandran, "The implications [of this] are staggering" (31). Before discussing these implications in my work, however, I want to work through a second example from Ramachandran. Here, the issue is not only the existence or general sensations of the phantom limb, but that of pain and movement (or lack thereof).

Ramachandran met Robert Townsend seven months after Townsend lost his left arm due to an invasive cancer.[23] After the amputation, Robert experienced a vivid phantom arm that was predominantly paralyzed, though would occasionally go into painful clenching spasms so intense that he felt his (phantom) nails digging into the (phantom) palm of his (phantom) hand. With great concentration, Robert could occasionally move his phantom arm, but when these spasms hit, attempting to unclench the arm could take upwards of thirty minutes. This, unfortunately, is not an uncommon occurrence. As discussed previously, many

people with phantom limbs experience sensations of movement and of discomfort, but pain and paralysis are also common complaints. To attempt to understand this experience, we must move to other parts of the brain.

While the sensory input from the body is processed in the somatosensory cortex, the sense of placement and movement of our bodies in space, our proprioception, operates more in the parietal lobes and the motor cortex. Neurologists and neuroscientists theorize that our "body image," our internal sense and representation of our body in space and time, is created in part through our parietal lobes, which integrate information from the rest of our body—eyes, muscles, and so on.[24] The motor cortex, similar to the somatosensory, also has a homunculus, though this one is situated upside down; from here, signals for motion are sent to muscle tissue, and the muscle tissue responds, returning a message that the motion has occurred. This information is also sent to the parietal lobe, creating constant updates of our body image in motion, and creating a loop of communication. Of course, a phantom limb cannot send this return signal, and yet the brain still perceives the motion as happening. Ramachandran identifies this process, in combination with the remapping of the somatosensory cortex, as the sources of the phantom limb experience: our means of sensing the body adjusts, while our body image itself remains relatively stable. As opposed to the relatively rapid sensory remapping (remember that Tom's amputation occurred only one month prior to the study), "body image" shows an interesting lack of flexibility in the same timeframe.

Attempting to understand pain and paralysis in phantom limbs depends on understanding the processes for creating body image and proprioception, but "attempt" is the key word. Pain is one of the least understood experiences in the body, due not in small part to

its incredible subjectivity. Some phantom pain is indeed due to scar tissue and/or nerve damage in the residual limb, as presumed by Mitchell, and can be relieved through further surgeries. Yet, as we discussed earlier, this does not apply to all cases. In regards to paralysis, Ramachandran offers some hypotheses, including learned paralysis. This applies to patients whose limbs were paralyzed prior to amputation. Here, Ramachandran suspects that when the command for motion is sent to the paralyzed limb, the visual feedback of the limb not responding creates a new pattern in the body image. When the paralyzed limb is then amputated, the brain retains this new "body image with paralysis," and thus the phantom limb is also paralyzed, often sensed to be in the same position as the former limb (e.g., the arm folded in a sling). Though interesting, this explanation also does not fit universally, as not all people with amputations have prior paralysis. It did, however, suggest a possible therapy to Ramachandran, one based on "seeing" the phantom.

Ramachandran hypothesized that if patients could somehow see the phantom limb move, this visual feedback might allow the brain to "unlearn" the learned paralysis. He constructed an extremely low tech "virtual reality box" by cutting two holes in the side of a cardboard box, then placing a vertical mirror between the holes. Patients were instructed to place each of their arms, biological and phantom, into a hole, with the biological arm facing the mirror. This created the optical illusion of "seeing" the reflection of the actual arm as the (now embodied) phantom arm. Ramachandran then instructed patients to position their actual arm to mirror the sensation of the phantom arm. So, for example, returning to the case of Robert Townsend and his painfully clenched phantom, Robert was told to clench his right arm and hand, and to dig his nails into his palm. Then, while watching through the box, he was to try and unclench both hands simultaneously.

It worked. Robert was not only able to unclench the phantom hand, this motion actually eliminated his pain, and not only under clinical settings. Robert took the mirrored box home and utilized it with success when new spasms contorted his phantom limb. Though not successful for all patients, Ramachandran discovered that mirror box therapy offered significant results, and it is still noted as the most promising adjuvant therapies, according to the previously referenced Black, Persons and Jamieson article.

Thus, despite the persistence of amputated limbs in body image, Ramachandran demonstrated plasticity and adaptation here as well. Again, we are brought to the implications of these studies.[25] Remember that prior to these discoveries in the 1990s, the adult brain was believed to be "fixed." Ramachandran also notes the prevalence of the "brain as computer" metaphor. Despite having deconstructed this metaphor in chapter three, my explanations of the processes of sensation and motion here seem to reinforce this metaphor, and early models of communication: brain sends message; body receives message; body sends message back. I also suggested earlier that the result of our new visualization technologies (MRI, PET, MEG) might be a reinforcement of seeing the relationship of brain and body in these absolute, mechanical models. This does play out to certain extents, as imaging of the brain is used to confirm hypotheses about how the brain processes information.

But this is only an extremely simplified model useful as a starting point for understanding neurological phenomena. If we push on these examples, the interactions of the technologies and the experiences appear more complex. Consider this remapping of the somatosensory cortex. The model of the homunculus and images from other visualization technologies form the frame for approaching the brain's involvement in phantom

phenomenon; the visual representations of brain function tell us what to expect in the experience of the body. However, upon examination, the frame shifts. What was "normal" (a "fixed" adult brain) is revealed to be flexible and plastic in ways unimagined, but comprehensible within this technological gaze. Here, the body-as-machine metaphor as metaphor does not disappear—the metaphor does not reinscribe the body as machine, but allows us to measure a deviation from expectation. The body and brain are not locked into a simple sender-receiver communication model (whereby specific nerves in the body fire only in specific locations of the brain), but one malleable and adaptive to interference and change. Thus, our model of the body and brain adapts as well, and, following Canguilhem's normative arguments, a "normal" brain becomes one that is malleable, not fixed. The technological gaze gives both the ground for and means to change this construction.

The example of the mirror box demonstrates a slightly different interaction of imaging and bodies. Here, the visualization technology (a mirror) is quite simple (though Ramachandran's use of it was notably influenced by virtual reality technology), and the patient's perception plays a larger role. This representation of the body is far more literal than that created by, say, a PET scan, but still is only representative.[26] In Ramachandran's therapy, the mirror-reflected arm serves as a visual prosthetic with which the patient actively engages. With this engagement, the visual becomes sensorial, and the patient can potentially change the haunting physical sensations of the phantom limb. Thus, representation as prosthetic seems to work in much the same way as that of Kurzman's physical prosthetic, though here the intervolvement of body-world first operates through sight, in an interesting twist on Merleau-Ponty's example of the hand holding the hand. Instead of the act of holding serving as a means of experiencing the hand as self and other, the act of seeing provides this,

as one sees and senses the flesh arm as itself (self), and the representation of the flesh arm as image (other) and other arm (self). Though different from the remapping example, the technological gaze (in remapping, as a construction; here, as literal seeing) again acts on our understanding of the body, revealing the body/brain as more malleable than we once believed.

Of course, these examples and therapies still do not wholly "solve" the issues of phantom limbs. Ramachandran's failures, as well as his successes, in describing and treating phantom limbs both reinforce the inexactness of our understandings of the brain. Why do some treatments work for some patients and not for others? We don't really know. Or rather, and perhaps more perplexing, we only sometimes know. What we do know is that the brain, in Ramachandran's words, is "extraordinarily labile and dynamic" (56).

While Ramachandran does give primacy to the brain as his central focus of study, this dynamism really seems to result from the interaction of the body as a whole unit, not one easily separable into brain/mind and body. This, then, as we've seen, begins to ground a historicized return to Merleau-Ponty's claims for the body: "The body is the vehicle of being in the world, and having a body is, for a living creature, to be intervolved in a definite environment" (94). To articulate this historicization, to demonstrate what is now different, and how, requires contextualization through a few moves.

The first is that which I've laid out above—the Foucauldian gaze created through development of technologies that allow us to see the body in new ways. Throughout his exploration of medical history, Foucault reveals perception not to be a concrete revelation of the truth of the body and disease, but rather a malleable lens, one which can be changed by a number of forces—new systems of disease, social and political upheaval, incongruities of

available systems. “Perception” both acts and is acted on, being reconstructed through historical influence and reconstructing that which is perceived. Applying Foucault’s methodology to contemporary medical perception reveals a new gaze wherein the body is not mechanistic and fixed, but plastic, interacting to various degrees with the visualization technologies. This perceptual shift reveals experimental evidence, in line with Ramachandran’s “experimental epistemology,” of Merleau-Ponty’s theories of body-world. The body (including brain) is malleable, not just visibly, but functionally. It is adjustable to trauma and intervention, as shown in the remapping of the somatosensory cortex; it is intervolved beyond its seeming limits, as suggested in the mirrored box. Current research on the relationships between phantom limbs, neurology, and prosthetics also show empirical evidence of this intervolvement.

The second move is also technologically based, but in a different sense than the medical model. This concerns the ubiquitous and participatory nature of “new” technologies in contemporary society, part of which moved *Time* magazine to name “You” as the 2006 person of the year. In article announcing this nomination, Lev Grossman notes the importance of Web 2.0, a concept of the internet as a meta-internet, where the Web is a platform for creating other Web content, where users control the creation of their own data through sites like Wikipedia, Facebook, YouTube, and Second Life, and through practices like blogging, and creating avatars, videos, and personal profiles. Web 2.0 exists through participation and interaction, both individually (e.g., a Facebook profile) and communally (e.g., a collaboratively created Wikipedia entry). These technologies and media are focused on adaptation and personalization: anyone with access can use these tools to shape one’s world, making it more convenient and individualized. Now, I want to be careful with

statements like that, which are broadly true throughout history and can practically define "technology" at large.[27] What I see particularly marking participatory technologies are the ways in which they are used to (1) reflect and create our identities, and (2) communicate with each other. Here, these too seem marked by a particular unfolding of body/world intervolvement, one wherein our identities extend beyond our bodies into the digital world. The practically unfettered ability to adapt these identity-bodies is not only "normal," but the very purpose of the technologies. In combination with the (relatively) portable, affordable, accessible, and personalizable devices that deliver it—like laptops, cellular phones, iPhones and Blackberries—Web 2.0 creates a culture (and an expectation) of ubiquitous, malleable, participatory technologies.

That, in combination with the first move, leads to the third: a perception of the body as a malleable technology in and of itself, or, the body *as* prosthetic. Consider again Ramachandran's mirror box, where the flesh arm through reflection visually and sensationally serves as a prosthetic of the phantom limb. This is not, however, a reversion to a Cartesian model, but rather something more similar to the participatory, personalized identity-body, or perhaps to Judith Butler's "gender" as performative; whereas for Butler, drag destabilizes any absolute gender category, here prosthetics/technology destabilize any absolute body category. Seeing the body as adaptable and still intervolved gives ground to then further adapt the body, to intervene beyond the realm of medical necessity. We see this already in abundant examples of plastic and aesthetic surgery; while by no means a new phenomenon, the increase of such procedures over the past decade, in number and kind, is significant.[28] The American Society for Aesthetic Plastic Surgery (ASAPS) claims 11.7 million cosmetic procedures (surgical and nonsurgical) were performed in the US in 2007, an

increase of 457 percent since 1997. These procedures have been popularized and normalized in part through reality television shows like *Extreme Makeover* and *Dr. 90210*, where patients commonly discuss how surgical interventions (like breast augmentation and liposuction) will help them reconstruct their current bodies in order to reveal a body that shows who they "really" are. Contemporary society does, then, accept adaptation for particular aesthetic means, treating bodies as literal canvasses for creating.

One final contextual move remains: considering technologically advanced prosthetics. Not only, following Foucault, has our medical gaze changed as a result of new technologies, our potentials for interceding on the body have changed. While prosthetics may have been utilized as early as 1069 B.C., their technological prowess was limited, perhaps functioning at best as does Merleau-Ponty's stick—as "an instrument *with* which he perceives…a bodily auxiliary, an extension of the bodily synthesis" (175-76). Current advancements in biomedical engineering create prosthetics that extend beyond this, reaching into the body, challenging through function and structure the seeming limits of flesh.[29] One such example is hybrid neuroprosthetic systems (HNPS), which suggest that residual nerves can be remapped to interact nearly effortlessly with prosthetics.[30] While prosthetics do not seem to take the place of phantom limbs in sensation, function, or body schema, new technological developments are creating further quite literal intervolvements of body and world.

This constellation of four moves—the technological gaze, ubiquitous and participatory technologies, the body as prosthetic, and technologically advanced prosthetics—creates a specific historical context in which to read Merleau-Ponty's body-world intervolvement. In the previous section I explored how intervolvement experientially destabilizes the myth of the "natural" body and creates a new phenomenological norm for bodies and technologies;

here, the constellation provides the contextual grounds for new social/cultural/medical norms. Acting together, they create a historicized phenomenological intervolvement. If the body is malleable in these specific functional and sensorial ways, if the body is intervolved with the world (or specifically here with prosthetics), then the notion of a "natural" (i.e., "naturally correct") body devoid of and/or removed from technology breaks down. Bodies here hold infinite potential for change and adaptation, becoming the embodiment of Canguilhem's inventors. Bodily norms then, in the sense I established in chapter two and explored earlier in this chapter, following Canguilhem's definitions, must also adapt, as must related definitions of abled and disabled, and frames of "fixing" and "enhancing" the body. I'll return to these terminological arguments at the end of this chapter, but first want to consider my argument thus far against alternate theoretical frames

The Always-Already

Of course, mine is not the only theory on these relationships of bodies and technologies—far from it. Perspectives from other particular lenses, also invested in undoing the boundaries between subject and object, need to be weighed in light of my claims: those of Bernard Stiegler, and those of posthumanism. Running through these, operating in different though related ways, are threads of language theories that I will tease out.

Stiegler

For Bernard Stiegler, the body is always already technologized. Working primarily from Heidegger, Derrida, and Leroi-Gourhan, he frames the boundaries of subject and object as questioning the "who" and the "what" (generally seen as, respectively, the human and the

technical) through the evolutionary development of the human. Stiegler sets out his task as follows, claiming to show

> how various contributions to a theory of technical evolution permit the hypothesis that between the inorganic beings of the physical sciences and the organized beings of biology, there does indeed exist a third genre of 'being': 'inorganic organized beings,' or technical objects. (17)

Traditionally, humans have been credited with creating technology, for developing the intelligence to initially pick up a piece of flint and use it as a tool. Technology was separable from and controlled by humans—and as we've seen, this perspective has persevered. But it is one Stiegler finds inherently flawed. Working from Heidegger's attempts to do away with the separation of subject and object, Stiegler integrates and challenges an evolutionary argument put forth by Leroi-Gourhan. Leroi-Gourhan reconstructs evolutionary history in relation to and in light of technology, defining "technology" broadly so as to include anything exteriorized from the body, including language. He claims that humans evolved as a result of and in coordination with technology—that the ability to stand on two feet freed our hands to grasp, freeing our mouths from the function of grasping; that picking up a piece of flint changed our brain, allowing the development of language and the abilities to change the tool. Evolution to "the human state" does not take place with developments in the brain, but with the hand, and it is this, then, that makes language "indissociable from technicity and prostheticity" (Stiegler 146, 145). For Leroi-Gourhan, the technical/tool equally invents the human, complicating the relationship of the "who" and the "what;" if the "who" is that which creates, and the "what" is that which is created, the human and the technical have switched places.

But Stiegler identifies a flaw in Leroi-Gourhan's analysis in his break "between the Zinjanthropian who is already a man, and the Neanthropian opening onto the human that we are," or what Leroi-Gourhan considers hominization (Stiegler 142). While the Zinjanthropians have the freedom of hands to grasp and the abilities to vocalize, "they still belonged to a world whose imperative values were zoological—a world that had not yet fully mastered the possibilities of technics and language" (Leroi-Gourhan 132). The Neanthropians, however, with a more developed prefrontal cortex, likely had "the powers of foresight and lucid consciousness" which allowed exteriorization through symbolic representation (Leroi-Gourhan 131). Stiegler notes a contradiction here in Leroi-Gourhan's analysis in that this exteriorization implies an interior that Leroi-Gourhan claims did not exist prior to the exteriorization. The human appears, then, in language. Stiegler writes:

> The movement inherent in this process of exteriorization is paradoxical: Leroi-Gourhan in fact says that it is the tool, that is, the *tekhné*, that invents the human, not the human who invents the technical. Or again: the human invents himself in the technical by inventing the tool—by becoming exteriorized techno-logically. But here the human is the interior: there is no exteriorization that does not point to a movement from interior to exterior. (141-42)

By prioritizing this specific secondary break, prioritizing the technicity of the Neanthropian over that of the Zinjanthropian, Leroi-Gourhan undercuts his own argument, creating an inconsistency that reinscribes priority to the "who"—that which has an interiority to be expressed through exteriority (i.e., the technical, the "what").

Stiegler further complicates this relationship of "who" and "what" through the lens of

Derrida's *différance*. Derrida's argument (de)centers around the fallacy of logocentrism, the conception that language (specifically the spoken word) directly expresses a fundamental Truth or Reality. He is particularly concerned with the positioning of writing as merely derivative of speech, of writing as a *tekhné*, thought by Plato (and onward through Western thought) to be a dangerous threat to the essence of humanity. Derrida instead posits that neither writing nor speech is primary; speech does not innately express "Truth," but rather holds the same position as writing—an always already imperfect representation of meaning. But for Derrida, this "imperfection" is all there is (and so then is not truly imperfect), thus leading to his theory of the différance. The meaning of différance pulls from two definitions for the French "defer": to be different from, distinct; and to delay, to put off. Herein lies the "problem," or for Derrida, the *potential*, of language—meaning is both always different (though differentiation, the distinction between words/concepts/ideas) and always deferred (delayed, never essentially reached or represented).

Derrida argues that problem of logocentrism spills beyond language, or, rather, that this problem in language is everything, fundamentally structuring philosophy, knowledge—essentially all of life. Logocentrism establishes one Truth, which inherently also creates an other, that which is outside, different, and often disregarded. This can be seen in common dichotomous pairs—man/woman, light/dark, good/evil, speech/writing, human/technical—where one term stands as the preferential norm, the defining truth against which all else is compared. The "other" term then faces negative consequences. Deconstructing language, exposing the différance, serves not only to destabilize the question of language, but the very notion of binary opposition, of an other, an outside to a (now non-existent) norm.

Différance, then, also destabilizes anthropocentrism, the primacy of humans in relation

to our dichotomous pairings with nature, and, of course, technology—again, the question of the "who" and the "what." Stiegler takes this up as follows:

> Différance is neither the *who* nor the *what*, but their co-possibility, the movement of their mutual coming-to-be, of their coming into convention. The *who* is nothing without the *what*, and conversely. Différence is below and beyond the *who* and the *what*; it poses them together, a composition engendering the illusion of an opposition. (141)

While Derrida is quite fundamental to his claims, Stiegler's argument does not move in lockstep with Derrida; though this issue is important, the differences that emerge there are not my main concern. I'm concerned with how they are similar, and where problems emerge for me in their similarity. Stiegler's work (and that of Derrida and Leroi-Gourhan), in grappling with these boundaries of bodies and technologies, clearly aligns with some of my goals, particularly in destabilizing norms and/of the "natural" body, and offers interesting and productive frames for seeing the interrelations of "who" and "what." However, these claims present two fundamental and intertwined problems for my argument, the first one of definition, the second one of historicism.

For Stiegler, the term "prosthetic" works broadly, as addition of any sort, including, as discussed, language. Specifically, Stiegler defines this as *not* replacement:

> A "prosthesis" does not supplement something, does not replace what would have been there before it and would have been lost: it is added. By pros-thesis, we understand (1) set in front, or spatialization (de-severance *é-loignement*]); (2) set in advance, already there (past) and anticipation (foresight), that is, temporalization.

> The prosthesis is not a mere extension of the human body; it is the constitution of this body *qua* "human" (the quotation marks belong to the constitution). It is not a "means" for the human but its end, and we know the essential equivocity of this expression: "the end of the human." (152-53)

This usage refers us to the originary definition of "prosthesis," of adding a letter or syllable to the beginning of a word, echoing the exteriority/interiority condition Stiegler notes in Leroi-Gourhan. To be "set in front," a condition of location, and to be "set in advance," a condition of time, both demand (past) and create (foresight) some "thing" to be set in relation to. Prosthesis (as techné) with the body then embodies the différance of the "who" and the "what" in time as the composition "human." Prosthesis here works as a figure as much as an object, operating in a conceptual relationship as well as a literal one. This figuring or conceptualization is not inherently problematic, but can become so in specific contexts, such as that of medical prosthetics. Here, the relationship of the prosthetic and the body is not simple addition, but often a complex interaction that includes that which has been lost. How does Stiegler's argument account, for example, for someone who has sustained an amputation as a result of illness or trauma? As of 2009, about 950 soldiers have had amputations as a result of trauma from the wars in Iraq and Afghanistan.[31] While there are numerous reasons for amputation, and numerous applications of medical prosthetics outside of amputation, that statistic represents one significant current population for which this question has resonance. It also presents an argument for historicity, which I'll address more fully in a moment.

Now, in one turn, Stiegler's prosthesis could offer a helpful ground for patients with medical prosthetics, working within Disability Studies' concerns, as addressed in chapter

two, with the problem of social expectations for "fixing" disabled bodies.[32] Stiegler's argument eliminates an absolute "natural" body separable from prosthesis; if prosthesis is always addition and not replacement, this potentially creates space for differing bodies, "misbehaving" bodies that are not corrected to the (now) destabilized "whole" but are added to (or not) in any manner of ways. [33] On the other hand, we cannot disregard that throughout history, evolution-based arguments have often been used to do great harm to disabled or "different" bodies. Employing claims for and specific constructions of "survival of the fittest," people with disabilities have been labeled as abnormal, as unfit.[34] This has been used to justify imperatives to "fix" disabled bodies to socially acceptable forms as well as arguments for, and more heinously *acts* of, euthanizing disabled people.[35] I am certainly not accusing Stiegler of any of this; however, in ahistoricizing prostheses, he misses significant historical changes, and thus has not precluded the possibility of someone taking up his perspective as normalization.

In an ontology in which we are always already evolutionarily developing with technology, we are always looking backwards or forwards—or, in Stiegler's frame, acting as Epimetheus or Prometheus—never quite considering the present. Stiegler, in fact, is arguing that our evolution moves outside of genetics, that the progression of human moves further into technology, removing the hereditary potential from eugenics arguments. But this does not negate the importance of remembering and recognizing this history of eugenics, and its potential re-employment as a technological imperative. Stiegler's move recuperates techné, creating a positive, productive, and progressive relationship of bodies and prosthesis, bodies as prosthesis. However, instead of broadening the potential for how we understand bodies, this position could be used to enforce, explicitly or implicitly, prosthetization and

technological integration. This potential could then justify the fears of docile bodies I argued against in chapter three, and the anxieties about Pistorius in chapter two.

A frame that inherently links bodies and technologies to progress falls into what I see as the same errors Foucault points out in the history of medicine. It does not consider the discourses and practices of this moment, nor the effects of our technologies in shaping our perception of technologies. I don't wholly reject Stiegler's or Leroi-Gourhan's claims of evolutionary history, but simply accepting this new history as truth does not seem to solve the still-present societal tension over prosthetized bodies. Stiegler's position essentially posits that this is merely the continued evolution of humanity on its path out of humanity, to a Posthuman world. Here, then, we must consider posthumanity.

Beyond the Break

Katherine N. Hayles posits an extensive explanation to answer the question "What is the Posthuman?"

> First, the Posthuman view privileges informational pattern over material instantiation, so that embodiment in a biological substrate is seen as an accident of history rather than an inevitability of life. Second, the Posthuman view considers consciousness, regarded as the seat of human identity in the Western tradition long before Descartes thought he was a mind thinking, as an epiphenomenon, as an evolutionary upstart trying to claim that it is the whole show when in actuality it is only a minor sideshow. Third, the Posthuman view thinks of the body as the original prosthesis we all learn to manipulate, so that extending or replacing the body with other prostheses becomes a

> continuation of a process that began before we were born. Fourth, and most important, by these and other means, the Posthuman view configures human being so that it can be seamlessly articulated with intelligent machines. In the Posthuman, there are no essential differences or absolute demarcations between bodily existence and computer simulation, cybernetic mechanism and biological organism, robot teleology and human goals. (3)

The moves of Hayles' four-part answer work together here, echoing Stiegler's position above.[36] To be Posthuman is to de-privilege biological substrates, as well as the concept of "human" as the evolutionary peak; to see the body as a prosthesis in processes of extension or replacement with other prostheses; and, "most important," to "seamlessly" articulate human beings with "intelligent machines." Again, similar to Stiegler, the point here is to liberate humans from a particular exclusive position, not only materially (flesh to technology), but in relation to the privileging of the intelligence and reason of (hu)man over all others. With this ground, the problems with ahistoricism that I detailed above still come into play.

However, Hayles' construction relies greatly on the idea of the cyborg, particularly as thought by Donna Haraway. Hayles notes:

> As Donna Haraway has pointed out, cyborgs are simultaneously entities and metaphors, living beings and narrative constructions.…Manifesting itself as both technological object and discursive formation, it partakes of the power of the imagination as well as of the actuality of technology. (115)

Hayles goes on to claim "Cyborgs really exist," specifying examples of actual cyborgs, with technological parts like pacemakers and artificial limbs, and "metaphoric cyborgs," people

who interact with technologies (computers, video games, etc.). Though this use of "metaphor" is not quite what Haraway is getting at, the simultaneity certainly is.[37] While a cyborg, or "cybernetic organism, a hybrid of machine and organism," by definition integrates border crossings, Haraway takes this beyond the bounds of technology and bodies (148). In her iconic "Cyborg Manifesto," Haraway argues for the deconstruction of borders between three significant dichotomies: animal/man, man/machine, and physical/nonphysical. She claims that maintaining these boundaries is not only artificial, but detrimental to the progress of all human beings. Out of this boundary-breaking, she poses "cyborg imagery" as a more fertile and creative model for thinking connections, for climbing out of our dualisms, and thus, for subverting damaging power dynamics in human relations and identity politics. This is based, though, in an historical and material expression of boundary-breaking. She notes:

> Late twentieth-century machines have made thoroughly ambiguous the difference between natural and artificial, mind and body, self-developing and externally designed, and many other distinctions that used to apply to organisms and machines. (152)

She sees the developments in technologies, through microelectronics and miniaturization as well as through "disturbingly lively" machines, complicating boundaries and making cyborgs both nearly invisible and ubiquitous (152). It is of note that she first published parts of this essay in 1984; over twenty years later, digital technologies and nanotechnology only further emphasize her claims.

Haraway uses this ground to show the potential for political destabilizations for any other dualisms, extending from the aforementioned dichotomies to include those between mind/body, nature/culture, men/women and primitive/civilized (163). Here, we come closer

to the metaphorical that Hayles first references (and also employs). Not only are cyborgs material manifestations of boundary crossing, they are myths and ways of thinking. This reflects Stiegler's use of the prosthetic metaphor, except with specific historical agency. Haraway claims:

> Cyborg imagery can help express two crucial arguments in this essay: first, the production of universal, totalizing theory is a major mistake that misses most of reality, probably always, but certainly now; and second, taking responsibility for the social relations of science and technology means refusing an anti-science metaphysics, a demonology of technology, and so means embracing the skilful task of reconstructing the boundaries of daily life, in partial connection with others, in communication with all of our parts…Cyborg imagery can suggest a way out of the maze of dualisms in which we have explained our bodies and our tools to ourselves. This dream is not of a common language, but of a powerful infidel heteroglossia….It means both building and destroying machines, identities, categories, relationships, space stories. (181)

While Haraway's cyborgs are, like Stiegler's prostheses, inherently positive and productive, her conception of technology is not. She recognizes the complicated histories of machines, of technologies, and how they have been politically employed to re- and op-press certain populations (women, lower classes, people of color). She also considers how women have been historically and problematically opposed to technology (by some feminist ideology as well as by culture at large), leaving them outside of the positive potentials of science and technology. These are the boundaries, parts of the "totalizing theories," that she sees cyborg

imagery offering a way out of. Building from post-World War II technological changes, as well as non-essentialist feminist theories, Haraway presents cyborgean multiplicities, "infidel heteroglossias" of infinite potential creations and connections, materially and metaphorically, to achieve quite specific feminist aims of reclaiming techno-science and changing political and economic relations.

Haraway's cyborgs present an interesting extension of the goals of my theories. Her consideration of the "actual" cyborgs resonates with (or at least does not contradict) my historicized phenomenological ground for the intervolvement of bodies and technology. It also makes room for a feminist perspective on technologized bodies, one which can counter the concerns of docility I addressed in chapter three. But her metaphorical cyborg offers an important politicization both in the positions of these bodies in society and the discourse used around/about them. I'll return to this point in a moment, but first want to turn back to the posthuman.

If Haraway's cyborgs are not on an evolutionary trajectory, but instead exist historically, how does this impact Hayles' Posthuman? Despite the seeming ahistoricity of her early definition, Hayles' discussions of the posthuman reveal a complicated position that resonates more with Haraway than Stiegler. While her posthuman body is a prosthesis, unlike Stiegler's it seems to be one *separate* from other prostheses/technologies. Particularly notable is her recognition that, "there is a limit to how seamlessly humans can be articulated with intelligent machines, which remain distinctively different from humans in their embodiments" (284). In his evolutionary view, Stiegler does not address the difficulties of integrations of bodies and technologies; though this could be implied in the very process of evolution, it is by the final turn smoothed out and (always already) seamless. Though Hayles

prosthesis + prostheses equation could be read in problematic metaphorical frames of "body as machine" (addressed in chapter three), this recognition of the limits of seamlessness undoes that, contradicting the last move in her "posthuman" definition. Within this contradiction, I see space for recognizing the often-experienced difficulties and messinesses of medical prostheses. In fact, this move makes Hayles' posthuman even less integrated with "intelligent machines" than Merleau-Ponty's intervolved body-world, as humans "remain distinctively different…in their embodiments." The meaning of this posthuman seems quite different than what Stiegler addresses.

I want to examine Hayles' explication of this meaning in the following two extended quotes. She writes:

> But the Posthuman does not really mean the end of humanity. It signals instead the end of a certain conception of the human, a conception that may have applied, at best, to that fraction of humanity who had the wealth, power, and leisure to conceptualize themselves as autonomous beings exercising their will through individual agency and choice. What is lethal is not the posthuman as such but the grafting of the posthuman onto a liberal humanist view of the self…the posthuman need not be recuperated back into liberal humanism, nor need it be construed as antihuman. Located within the dialectic of pattern/randomness and grounded in embodied actuality rather than disembodied information, the posthuman offers resources for rethinking the articulation of humans with intelligent machines. (287)

> Bruno Latour has argued that we have never been modern; the seriated history

> of cybernetics—emerging from networks at once materially real, socially regulated, and discursively constructed—suggests, for similar reasons, that we have always been posthuman…The best possible time to contest for what the posthuman means is now, before the trains of thought it embodies have been laid down so firmly that it would take dynamite to change them. (291)

Hayles makes two interesting moves here. In the first quote, it is clear that posthuman is not just a condition of bodies and technologies, but one of politics, of moving past a particular view of the "human" posited during the Enlightenment and tied to specific bourgeoisie social and cultural positions. It seems that the posthuman could then be doing the same work as Haraway's cyborg in expanding the political potentialities of different bodies; it is, then, not (necessarily) "antihuman," in opposition to the human, but "after" this specific kind of liberal humanism. In the second quote, Hayles, following Latour's discussion of modernism, then suggests that "posthuman" is perhaps the more accurate term to describe "human," that "we have always been posthuman." What is left is to create this definition through (presumably) flexible means so that it does not become a new absolutizing frame through/to which (post)humans must comply. Her "now" in this claim is, notably, 1999. A decade has passed since then, and definitions of "posthuman" have proliferated, often using Hayles as an originary touchstone. I return to this text for that reason—this theory as the grounds of others—and to consider how her claims have resonated.

Katherine Ott, in her introduction to her 2002 collection on the histories of prosthetics, levels some scathing criticism against movements such as the posthuman, claiming, "The people in the history this volume chronicles were too busy living to be restrained by our post-structuralist worries over the cultural contingencies of what they did or who they were" (3).

Though I'm clearly not inclined to disregard the importance of post-structuralism and cultural contingency, I think Ott's statement is an important one, pointing to the gaps that can exist between theory and people who are "too busy living" to be concerned with the musings of academics. This is in part also my impetus for integrating the contemporary stories of people with prosthetics, and insisting on an historicized theory (a move with which I think Ott, an historian, would agree). We might also note that other essays in her collection chronicling these histories are indebted to, if not outright engaging in, post-structuralist theories; in fact, the plurality in the book's subtitle, "Modern *Histories* of Prosthetics" (my emphasis), reflects this. However, what Ott seems truly concerned with are the considerations of prosthetic metaphors divorced from any reference to people who have what I've been here calling medical prosthetics. Her more persuasive criticism is perhaps here:

> Voluntary bionics can be very desirable. But when the wearer has less of a choice, or when the technology references disability and not glamour, the attraction of engineered beauty fades. Rehabilitation technology is not worshiped in popular culture. A dusting of disability on the technology ends the beauty pageant. Cyborgs are divorced from disability and are commissioned by needs other than the physiological. (21)

Again, while I'm hesitant to fully embrace this critique, Ott does have a point. Too often, the experiences of disability are disregarded in the consideration of technologizing bodies—another point which I have attempted to address in my theoretical critiques. However, as I've also attempted to address here, the cultural tide is beginning to change. People like Oscar Pistorius and Sarah Reinertsen are strong examples of this. Their rehabilitation technologies have quite eagerly engaged the attention of popular culture, not only as engineered beauties

(which their running legs certainly are), but as technologies commissioned by physiological needs.[38] Pistorius' claim that he is "not disabled, [he] just do[esn't] have any legs" is a further example of the blurring of the lines between what Ott calls "voluntary bionics" and medical prosthetics. But this is not, in fact, the experience of all people with prosthetics, or people with disabilities.

Now, with this in mind, I still contend that disregarding the theories to which Ott objects is not a wholly necessary move.[39] Though Haraway does not directly address the (dis)abled body, her contextualization and historicization, combined with her feminist perspective of broader considerations of different bodies, creates a space for this kind of consideration.[40] And, though to a lesser extent, something similar could be said for Hayles' posthuman. However, despite Hayles' later definition of "posthuman" as a post-liberal-humanism's-human, I take issue with the terminology. As there are those for whom the acquisition of basic human rights is still a struggle, terms like "posthuman" and "cyborg," with their non-human resonances (at least in pop culture), are problematic. This works much in the same way as Pistorius' construction as dis- and super-abled: people whose bodies do not meet standard cultural norms (be this due to ability, sexuality, ethnicity, and so forth) have at times been labeled as sub- or non-human; affixing terms that imply a movement past "human" again potentially subjects them to discriminations and exclusions, or, as suggested in ideas of the "supercrip," to fetishizations. I see the term "somatechnics," coined by scholars from the department of Critical and Cultural Studies at Macquarie University (Australia), as creating a more positive and productive discourse for my purposes.

As explained by Nikki Sullivan, somatechnics is "the notion of a chiasmic interdependence of soma and techné: of bodily-being (or corporealities) as always already

technologized and technologies as always already enfleshed" (314). The Somatechnics Research Centre website further contextualizes this, describing technologies as "the means in and through which bodies are constituted, positioned, and lived;" somatechnics then "reflects contemporary understandings of the body as the incarnation or materialization of historically and culturally specific discourses and practices."[41] "Somatechnics" clearly resonates with the previous discussions, integrating the philosophical, discourse-based, and cyborgean concepts in a term that reflects the "interdependence" of body (soma) and technology (techné). The particular appeal of this term lies in its operation as descriptive, not prescriptive. Instead of relegating a person or body to a specific category (human? post?), "somatechnics" describes the varied relationships of soma and techné. This variety is reflected in the types and topics of research conducted by the core members and research associates, a brief list of which includes the following: genital modification; sport, coaching and the body; biometrics and digital discrimination; wrong bodies; transformation and space; disability studies; queer theory; pornography; and fat studies.[42] I see "somatechnics" acting much like Judith Butler's performativity of gender, as I addressed previously, destabilizing any absolute body category. Constructions of bodies, metaphorical or technological, can then be considered contextually, historically, and through the agency of the individual.

Becoming Who We are Meant to Be

Throughout this chapter, I lay the ground for a new epistemology, for understanding prosthetized bodies as historically-situated phenomenological somatechnics. Canguilhem writes, "In the final analysis it is the patients who most often decide—and from very different points of view—whether they are no longer normal or whether they have returned to

normality" (119). This call for individualized self-definition and self-creation is precisely what I'm getting at here, with the clarification that "normal" is as contextualized as bodies. In other words, Pistorius can claim that he is not disabled without inscribing that claim on any other person with amputations (or other conditions). Pistorius may be declared ineligible to compete in the Olympics, so long as what defines "fair" technologies *in that context* takes into consideration training, dietary supplements and pharmaceuticals, and running shoes and equipment. Someone may choose to have multiple prosthetic legs to fit any occasion (running, dancing), or to not use prosthetics at all. Recall the example of Cherry Darling from chapter three: when she is given her prosthetic gun-legs, they come with the invocation to "to become who [she was] meant to be." This hyperbolic example reflects Canguilhem's vital question: "To the extent that living beings diverge from the specific type, are they abnormal in that they endanger the specific form or are they inventors on the road to new forms?" (141). We are inventors. Here, I've laid the grounding for understanding these inventions. In the next chapter, I'll examine some ways these inventions are already playing out in the realms of aesthetics, sports, and medicine.

[1] This is a bit of a misquote from Carl Sagan (*Cosmos*), but a popular one.

[2] Some children born with limb loss also experience phantom limbs (Ramachandran; Mayar, et al.). Additionally, other "phantoms" have also been reported, including phantom breasts post-mastectomy and phantom penises post-amputation (see Ramachandran and McGeoch; Crone-Munzebrock (1950, 1951); Weinstein et al.; Christensen et al; Staps et al.; Fisher; Heusner).

[3] See Sherman, Richard A. *Phantom Pain*. New York: Plenum Press, 1997.

[4] Following Foucault, I resist calling these "advances," instead considering how our construction and understanding of the medical body has changed over time. I will explicate these ideas more fully a bit later in the chapter.

[5] I am not suggesting that the pain or discomfort of phantom limbs is not problematic, nor that one should not receive treatment to lessen suffering; the "problem" here, again, is how we define the boundaries of bodies.

[6] This example comes from Merleau-Ponty's *The Structure of Behavior*; all other Merleau-Ponty examples and quotes are from *Phenomenology of Perception*.

[7] Of course, in Foucault's docile bodies, we must consider norms and power; I'll return to address these in a moment.

[8] He credits this example, or parable, to Herbert Simon in Simon's 1969 /81 *The Sciences of the Artificial*. Haugeland then interprets the parable in relation to his own theories on systems.

[9] I will consider the potential of an evolutionary argument in regards to prosthetics a bit later.

[10] I address the details and issues of Pistorius' case extensively in chapter two.

[11] Again, Pistorius' amputations took place when he was ten months old.

[12] Of course, much of the movements of post-structuralism and of social constructionists reject this singularity of experience or author as well. Derrida's "Structure, Sign, and Play" and Barthes "Death of the Author" are obvious fundamental examples of these arguments.

[13] This is certainly true for western cultures, and the US in particular; it also and increasingly applies to other cultures and nations as well.

[14] See *Discipline and Punish*

[15] This is an extremely truncated explanation of the anatomo-clinical gaze as explored in Foucault's *Birth* chapters eight and nine. The new gaze develops from changes in pathology practice, Bichat's understanding of the tissue system, questions about the relationship of symptoms and the surface of the body, and especially the understanding of death in the process of life and disease. Foucault particularly notes three dimensions in which this new gaze travels within the body: "vertically from the symptomatic surface to the tissual surface; in depth, plunging from the manifest to the hidden; and in both directions, as it must continuously travel if one wishes to define, from one end to the other, the network of essential necessities" (135). These create a body with depth, where disease is not simply traced, but its signs interpreted.

[16] While the brain is a mass of nerve tissue, it lacks pain receptors, making it possible to perform brain surgery under local anesthesia, leaving patients awake to give feedback.

[17] Note that the "brain" is not the same as the "mind"; though brain and mind are related, this relationship is neither reducible nor absolute, but the focus of much continued debate and study among philosophers and neuroscientists.

[18] The concept of a homunculus is centuries old, and not established by Penfield. However, he is the first to map its neurological representation with the assistance of technology (electrodes, etc.).

[19] Consider particularly Burke's terministic screens and Turbayne's metaphor as sort-trespassing, discussed in chapter three.

[20] Information about the cases is from the article and the book; these cover virtually the same material, though with very different audiences–the general public for the book, and of course the scientific community for the article. All of Ramachandran's quotes here are from his book, not the article, unless otherwise noted.

[21] Ramachandran refers to this patient as V. Q. in the article in *Brain*.

[22] Discussed in Ramachandran's book, Tim Pons, et al. published this research in *Science* in 1991.

[23] Ramachandran refers to him as Patient R. T. in the *Brain* article.

[24] There are many theories and terms for this sense of self. Ramachandran uses "body image" as defined by the neurologists Brain and Head in the early 20th century. Mayar, et al., give a good lit review of the issue, including definitions of "body image" (Fisher), "body awareness" (Kudar; Lakatos), and "body schema" (Paillard; Haggard and Wolpert).

[25] These are only two of countless studies Ramachandran recounts in his book *Phantoms on the Brain*, and in the rest of his research. Other contemporary studies, as previously mentioned, demonstrate and confirm similar findings; in addition to articles by Black, et al., see also Mayer, et al.; Alschuler and Ramachandran; Ketz; and the Va/DoD recommendations.

[26] We do not need an expert to "read" the mirror image, as it reflects the body that we know, while in PET scans, the representation must be interpreted by an expert.

[27] Of course the technology of the wheel could also be adapted for personalization and convenience; I thank my colleague Jason Helms for complicating and teasing out these ideas with me.

[28] See Sander L. Gilman's *Making the Body Beautiful* for an excellent history of aesthetic surgery.

[29] I'll address these more specifically in chapter four.

[30] For the relationship of prosthetics to body schema see Mayer, et. al "Body Schema and Body Awareness of Amputees." For information on HNPS, see the Dhillon and Horsch; *IEEE Transactions on Biomedical Engineering* special issue on HNPSs, 56:1, 2009.

[31] This statistic is from an article by Mark Roth, wherein he quotes Ryan Blanck, a specialist from the U. S. Army's Center for the Intrepid in San Antonio, TX.

[32] See Mitchell and Snyder.

[33] "Misbehaving" in Garland-Thomson's sense, as discussed in chapter two and three.

[34] See my extended discussion of histories of norming in chapter two for details of this, particularly from Disabilities Studies scholars such as Stiker, Mitchell and Snyder, Davis, and Garland-Thomson.

[35] Certainly this is not true of all arguments, and Canguilhem is an excellent example of the opposite. A sophisticated understanding of the process of evolution reflects that norms of "strong traits" are socially constructed. However, particularly post-Holocaust and other genocidal atrocities, we cannot

ignore the potential dangers of the relations between evolution, norms, and eugenics. See also essays in *The Disability Studies Reader* including by "Constructing Normalcy" by Lennard J. Davis and "Abortion and Disability" by Ruth Hubbard.

[36] To be clear, Hayles does not use Stiegler in her work; the relations and juxtapositions of their claims are mine.

[37] This metaphor is not really Hayles' use, either; she spends much of her text exploring the cyborg and Posthuman in science fiction and as other "products of discourse" (115).

[38] Another example of this changing tide, particularly in terms of the "beauty pageant," is Aimee Mullins, who I will address in chapter five.

[39] Many others would agree to disagree with Ott, including those in Disability Studies. See, for example, Smith and Morra's *The Prosthetic Impulse*.

[40] Here, at least, Haraway does not address disability, though she does in more recent works, such as her reflection on her father's relationship with his wheelchair in her book *When Species Meet*.

[41] See also Pugliese and Stryker for another excellent explanation of the term.

[42] Information found throughout the Centre's website.

Chapter Five

Adaptive Inventors

I say never be complete, I say stop being perfect, I say let...let's evolve, let the chips fall where they may.

Fight Club

At the end of chapter two, I suggested that an underlying cause of Pistorius' Olympic case was a problematic cultural myth or story of the natural body. The story went like this:

> A natural body is absolute, removed from any influence or interaction with society, culture, or technology. It is pure and untouched, held forth as an ideal state for bodies. "Outside" forces contaminate this purity and must be mitigated. The influences of the non-natural on the natural create bodies with unfair advantages, or alternately reveal lacking bodies, inferior to natural (implicitly also whole, unmarred, fully-functional) bodies.

As we saw in chapters two and three, two additional issues unfolded from this: the problem of discourse and labeling supported by that restrictive norm (e.g., dis- and super-abled, fixing versus enhancing); and the question of the relationship of prosthetics and docility/norming. In the last chapter, I proposed the phenomenological somatechnic as a model for thinking about these bodies within an historically-situated frame—the scaffolding of the four moves

of the Foucauldian technological gaze, the ubiquitous and participatory Web 2.0 technologies, the perception of the malleable body *as* prosthetic, and the advancements in prosthetic technologies. From that, then, I offer a new story, one that more accurately reflects contemporary prosthetized bodies:

> Following Merleau-Ponty, the relationship of bodies and technologies (world) is best seen as an intervolved continuum. The malleability of the body, understood in part through the technologized-gaze of neuroscience, and advances in technology (medical prosthetics and otherwise), destabilize any "absolutes" in body construction. The body as somatechnics reveals constant performative constructions wherein bodies (can (be)) change(d) according to need. What is "natural" is change and adaptation. Bodies cannot be simply categorized as abled, dis-abled, or super-abled, but must be understood in constantly changing sociocultural frames.

In this concluding chapter, instead of anxieties and limits, I will consider three specific frames through which we can see this epistemology enacted. First, Aimee Mullins' reflections on her experiences with prosthetics in the past ten years present what we might consider a shifting "prosthetic aesthetics." Second, the organization Adaptive Action Sports offers a means of grappling with conceptions of (dis)ability in sports. Third, two stories of technologically advanced prosthetics demonstrate changing medical practices in regards to amputation and prosthetization. While these examples present interesting models for putting this new story into practice, they are certainly not without complications of their own. However, they lay ground for areas of future research into the implications of my phenomenological somatechnic.

Prosthetic Aesthetics

"Pretty Legs"

Aimee Mullins is a spokesperson, an actress, an activist, a model, an athlete, and a woman with prosthetic legs. Her story is in many ways is similar to Pistorius': she was born with bilateral fibular hemimelia and had bilateral below-the-knee amputations at about a year old. She grew up on prosthetic legs and was always a formidable athlete; she also became a record-breaking runner while a student at Georgetown and in the 1996 Atlanta Paralympics. These experiences led to her giving a first talk for the TED[1] conference in 1998. Simply titled "Amy Mullins on Running," her presentation focused on her development as a runner and an athlete with prosthetic legs, touching as well on other experiences relevant to how she negotiated her life with/through her technologized body. To this end, Mullins demonstrates three sets of her legs: legs used for playing tennis and softball, legs for running, and what she calls her "pretty legs." She claims to have been the only person in the United States with this highly realistic prosthetic, which was a basic prosthetic limb designed to be worn solely with two-inch heels, with a detailed silicon covering. Her "pretty legs" function to make her attractive by traditional normative aesthetics; they are mimeses of flesh and ideal femininity, Barbie feet recreated for a real girl. With features like visible veins and hair follicles, details that many women try to minimize or hide, they are presumably created to "pass" as "normal" legs with minor, realistic flaws. Mullins comments on these legs, noting that "while I'm such a serious athlete on the track, I want to be feminine off the track, and I think it's so important…not to be limited in any capacity, whether it's…your mobility or…even fashion." Here, she acknowledges the importance of her prosthetics offering adaptability, lack of

limitations, and aesthetic appeals, though the aesthetic itself is quite limited. “Beauty” comes in the image of a whole or “normal” body, a returned reference to the “natural” (i.e., “naturally correct”) body.

In 2009, Mullins’ returned to give a second TED talk, titled “Aimee Mullins and her 12 Pairs of Legs,” this time addressing what had come to pass for her since 1998. Mullins discusses the opportunities for modeling and acting that she gained subsequent to that first talk, experiences that were as varied as the prosthetics the jobs required. She posed for magazines wearing her cheetah legs, displaying both her athletic prowess and her prosthetic marvels; she did high fashion runway work, where she wore intricately carved wooden legs that passed as fancy boots; she performed in the *Cremaster Cycle*, artist and filmmaker Matthew Barney’s epic project (including five feature-length films and major museum exhibitions), where she wore a fantastical variety of prostheses, including “glass slipper” and “jellyfish” legs (both made from optically clear polyurethane) and legs made of soil and potato and beet roots. Mullins’ uses these various prosthetic models as a frame for this later discussion.

She describes her 1998 presentation as a call “to innovators outside the traditional medical prosthetic community to come bring their talent to the science and to the art of building legs,” and to cease “compartmentalizing form, function, and aesthetic and assigning them different values.” Eleven years later, she feels that the call has been answered. Mullins’ new legs are clear examples of prosthetic advancements and innovations, with different legs combining different relationships of form, function, and aesthetics. Her cheetah legs primarily privilege function, their form following their purpose for speed in running; brought into photo shoots, though, they embody a technological aesthetic, with their sleekness and

curves often mirrored in how Mullins' body is positioned.[2] Mullins' sees "poetry" in her wooden legs, carved like sculptural art, form woven with aesthetic, though still fully functional (at least for the runway; Mullins does not address their comfort or practicality). The jellyfish legs represent for her pure "whimsy" in form: instead of feet, winding tentacles extend from the ends. They are entirely nonfunctional for ambulation, serving only an aesthetic purpose in the context of Barney's art.

Mullins' legs, and her experiences with them, serve as her springboard to consider prosthetic rethinkings of disability, beauty, and purpose. They represent a breakdown, as she says, of her previous need to "replicate 'humanness' as the only aesthetic ideal" of beauty. She concludes this talk by claiming:

> …the conversation with society has changed profoundly in this last decade. It is no longer a conversation about overcoming deficiency. It's a conversation about augmentation. It's a conversation about potential. A prosthetic limb doesn't represent the need to replace loss anymore. It can stand as a symbol that the wearer has the power to create whatever it is that they want to create in that space. So people that society once considered to be disabled can now become the architects of their own identities and indeed continue to change those identities by designing their bodies from a place of empowerment.

For Mullins, beauty is essential to humanity, and is created in part with the poetry and whimsy she finds in her prostheses. Through this potential for empowered bodily architecture (reflecting the malleability of the body as phenomenological somatechnic), Mullins sees the potential to move beyond negative frames of deficiency and disability often ascribed to people with amputations. Mullins' feels that these innovative prostheses move us "closer to

understanding our collective humanity," particularly through complicating the relationship of "disability" and aesthetics. Indeed, if we consider "humanness" as the traditional prosthetic aesthetic of beauty, many of her examples do expand far beyond this norm represented by her earlier "pretty legs," presenting a newly broadened prosthetic aesthetic.

Now, Mullins' ideas could be critiqued as a bit over-romanticized and idealistic, but her lived experiences as a woman with prosthetics, seen through her retrospective glance over the past decade, offer a relevant historical and personal perspective on aesthetics of beauty. However, her position has some significant limits, as well. Her ground for complicating the relationship of beauty and disability stems from recounted conversations in which people compliment her attractiveness, stating that she doesn't "look disabled;" Mullins replies "That's amazing, because I don't feel disabled, either." Her self-labeling here reflects Pistorius' similar claims, and this, for me, is not problematic (and I will discuss it further in the next section). However, this full conversation also implies that one cannot be both "disabled" and "beautiful," an extremely problematic suggestion. This, combined with the context of Mullins' prosthetic experiences in modeling and acting in popular media, has garnered some significant critique, particularly from Marquard Smith.

Despite the aesthetic variety demonstrated through her prosthetics, Smith sees images of Mullins functioning as relatively standard sexualized representations of women in media. Much like Mills, Reinertsen, and Darling, as we addressed in chapter three, Mullins embodies the current ideal feminine form: blonde, thin, athletic, and attractive. Smith argues that between this visual appeal and the construction of her achievements, Mullins ceases to be an amputee:

> Her image became commercially and aesthetically palatable because of the ways in which the power of the human spirit was celebrated over the fact of her disability, that she refused to be a victim of her disability and was proud to show us that this was the case.…her image becomes a visible illustration of the recent eroticization of disability because she is sexualized as an *able*-bodied woman, one who just happens to be an amputee. That is to say, she is not really eroticized because she is an amputee. At best, her status as an amputee must be acknowledged and disavowed simultaneously—and her prosthetic legs, more than just a substitute for her missing limbs, allow us to argue her back into existence as a cyborg, a prosthetic body, a figure of supraerotic fantasy. (58)

Smith makes an interesting point, and one with which Mullins might well agree, as she does seem to disavow the sole role of "disabled," visually, through her athletic achievements, and through her own claims. Certainly, society embraces the narrative of overcoming disability, and shows great preference to beauty, or "aesthetic palatabl[ity]." And it is indeed likely that, were Mullins not physically attractive and (cap)able, she might not have achieved success as a model, actress, and spokeswoman. These are all reasonable arguments, and ones that demonstrate the lack of aesthetic variability in beauty. However, his argument that she essentially ceases to be an amputee because of this is problematic. He seems to leave Mullins with few options, none of which he seems to approve: she can be a "Cyborgian sex kitten" (and thus not really an amputee) or a victim of her disability (and thus not sexualized). Here, then, we come across a conundrum similar to that faced by Pistorius and definitions of "abled;" there does not seem to be room for Mullins to be a complex woman—an amputee

who is sexual and, at least in certain constructions, not wholly disabled. While in a final turn, Smith allows that the images of Mullins "contribute to an important increase in the visibility of the differently abled bodies of amputees," he then retreats, claiming that "Ultimately, her differently abled body does not challenge any esthetic conventions of beauty or offer (as some working in Disability Studies would have it) potentially disruptive possibilities in and of itself" (59). This conclusion seems as pessimistic as Mullins' claims of beauty are naïve. Both contribute to understandings of the limits of aesthetics, yet are ultimately limited in their own views. While Mullins sees the potential for variability in prosthetic aesthetics, she is perhaps blind to her narrow definition of beauty; Smith acutely dismantles a particularly narrow conception of beauty/sexuality, but fails to allow for an aesthetic that encompasses amputation and variability of prosthetics.

Seen together, however, these perspectives offer some sense of what this new model of prosthetic aesthetics of beauty might include:

- the possibility for prosthetics to be more than just mimetic placeholders for a human aesthetic;
- a decompartmentalization and equalization of the values of form, function, and aesthetics;
- a sense of "beauty" beyond the limits of the current ideal, feminine form;
- inclusion of variable, shifting constructions of bodies within and beyond those of disability, amputation, and cyborgs.

Again, these ideas resonate through my previous discussions; though I have primarily addressed intervolvements of prosthetics and bodies functionally and medically, this integrates the visual work of prosthetics. Here, the malleability of the appearance of the body

emerges from the malleability of the body as prosthetic: as the body is materially adapted, so it is visually adapted, whether the purpose of that adaptation be functional or aesthetic. Though Mullins gives a timely voice to these issues, she is not the first to do so by far.[3] Cosmetic surgery has long laid claim to such adaptations, though the goals of those procedures are often what I have been arguing against: "fixing" the body to a (culturally constructed) norm, and here one of beauty, instead of function or health. Cultural analyses, like the above by Smith, or those by feminist critics like Bordo (as I addressed in chapter three), also present valuable and quite damning critiques of this norming. In advocating prosthetization as I am, particularly aesthetically, I could be accused of also advocating such norming procedures as breast implants or tummy tucks; like Mullins, Smith might suggest that I am "not challeng[ing] any esthetic conventions of beauty" (59). To a certain extent, this is not incorrect: to argue for individualizing bodies, for variable and adaptable aesthetics, is to allow for not only adaptations that expand these norms, but for those that reproduce the norms. However, I am not arguing for a specific new aesthetic norm, but for change and adaptation *as* normative. With that, then, we can see here the beginnings of what we might call an adaptive prosthetic aesthetic.

Participatory Adaptation

Throughout this work, I have considered the importance of language in the conception of prosthetized bodies, from Pistorius' problematic construction as both dis- and super-abled in chapter two, to the perception of the mechanized body though effects of scientific and medical rhetorics in chapter three. At the end of chapter four, I take this up in challenging the use of "posthuman" and "cyborg" as adequate terminology for prosthetized bodies, in part

due to Ott's critique that cyborgs do not connect to disability issues. I do not want to make invisible the experiences of people with disabilities by norming or overenthusiastically fetishizing the technologization of bodies, to fall into the trap of "fixing" bodies to particular "abled" states. Yet I have also regularly heralded Pistorius' "not disabled" claim as one productive way for thinking through the experience of prosthetized bodies. These positions may seem contradictory: on one hand, I stand against terminology that is exclusive of disability; on the other, I support a particular rejection of disability. However, I don't think this is necessarily the case. Pistorius' claim is precisely that—his own self-definition of his experience, and one that suggests the potential limits of the term "disabled" in specific social constructions; this is quite similar to the limits Ott sees in the term "cyborg." What these positions suggest, then, is the complications of labeling, and the need for terminology that reflects the varied experiences of intervolvement.

To this end, then, I want to turn to the model of "adaptive athletics." In August 2008, the Associated Press ran a story featuring the organization Adaptive Action Sports (AAS). In the feature, co-founder Amy Purdy discusses her personal history as a motivating factor in beginning the organization, explaining, "I was a competitive snowboarder before I lost my legs at the age of 19. So after I lost my legs all I wanted to do was get back into the sports that I loved, which was snowboarding and skateboarding and wakeboarding."[4] Purdy notes that there was a lack of resources "for people like me, who have a disability but love action sports." Thus in 2005, along with Daniel Gale and Garry Moore, she founded AAS, a non-profit organization with a mission to "create and promote action sport camps, events and programs for youth and young adults living with permanent physical disabilities. Action sports we believe encourage individuality and creativity while building independence and

self-confidence."[5] The term "disabilities" appears almost solely in this mission; the rest of the website adheres to the "adaptive" terminology, focusing both on athletes' adaptations to life after amputations, and on the technologies that adapt the sporting equipment (snowboards, etc.).[6] Through email, I asked Daniel Gale about these rhetorical choices. His reply reflects a clear purpose:

> We do have to use the "dis" word in our mission statement in order to be clear to the [layman] but we don't like it.
>
> "Disabled" as a term used to describe someone living with a "dis"ability can be quite "dis"couraging and "dis"courteous. "Dis" carries with it "not" and "fail to." Care should be taken when labeling a community of people. The "adaptive" youth of tomorrow deserve better than "disability."
>
> Through our programs and events we encourage individuals living with "disabilities" to break down the perceived barriers that society has given them. Our athletes adapt to their circumstances in order to live and excel in the life they choose. Something as simple as being called an "adaptive athlete" rather than "disabled" is helping to break down those perceived barriers and begin[ning to] encourage positive life paths. (email communication 2 June 2009)

Gale's passion for this issue is unmistakable in his explanation; his rejection of "disability" echoes and further articulates the claims of Pistorius.

This position stands against a very different iteration of "disability," presented by Mitchell and Snyder, in their introduction to *The Body and Physical Difference*:

> [A]n expansive definition [offered by the Americans with Disabilities Act] identifies the terms *disability* and *disabled* as denoting more than a medical condition or an essentialized "deformity" or difference. Unlike the terms *handicapped* and *crippled*, which suggest inherent biological limitations and individual abnormalities, this collection employs a definition of disability that denotes the social, historical, political, and mythological coordinates that define disabled people as excessive to traditional social circuits of interaction and as the *objects* of institutionalized discourses. The term does not seek to diminish or deny the variables and limitations that comprise the physical lives of disabled people, but rather to forward a notion of physicality that is cross-sectioned with and informed by narratives of malignancy, excessive dependency, and the parasitism of a special needs community. *Disability* provides a definition of a limited physical body that is not simultaneously assumed to be extraneous to definitions of citizenry and humanity. Approaching questions of disability in this manner allows scholars to consider the social, artistic, and political uses that disability has served. (2-3)

For their work, "disability" is a term of empowerment, overcoming earlier problematic and stigmatizing terms like "handicapped" and "crippled," destabilizing essentialization of "deformity," and offering political mobilization for inclusion in "definitions of citizenry and humanity." Mitchell, in the introduction to Styker's *A History of Disability*, notes "The rhetoric of sameness dominates the twentieth century by vehemently promoting the erasure of differences as its ultimate goal—we are all essentially the same and therefore equal" (xii). For him, "disability" helps disrupt that sameness. For Gale, though, "disability" is quite

obviously a problematic term, one that limits and reinforces social barriers. He and Pistorius both actively reject Mitchell and Snyder's definition of disability as a "limited physical body."[7] The term "disability" fails to empower, in effect trapping them in a "rhetoric of sameness" that fails to represent their experience. Mitchell and Snyder note the importance of the multiple "coordinates" that define people with disabilities, a perspective that resonates with my emphasis on historicized perspectives; Gale perhaps resides in a different coordinate, then, influenced by the idea of "adaptive" as a term of empowerment and positively representation.[8]

Now, using the word "adaptive" to describe athletes and athletics is certainly not limited to the AAS, nor is it new; its roots seem to begin as early as the 1950s, in rehabilitating practices for injured veterans, particular through skiing.[9] Relevant national and international sporting associations vary in their employments of the term. The International Paralympics Committee (IPC), Disabled Sports USA, and U.S. Paralympics regularly use "disability," though a search of the IPC website reveals "adaptive" used particularly in regards to rowing events. There, they offer a useful, if broad, definition: "'Adaptive' implies that the equipment is 'adapted' to the user to practice the sport, rather than the sport being 'adapted' to the user." Additionally, a Google search for "adaptive athletics" reveals about 196,000 results, including organizational websites, blogs, and news reports that contain the phrase; in many organizations, "adaptive" and "disabled" seem to be used interchangeably. These examples suggest a breadth to the term that perhaps extends beyond my historicized scaffolding; however, Purdy's experience and Gale's articulation create a situated resonance for "adaptive" within this frame.

Despite this history of adaptive athletics, Purdy, when looking for a way to continue her sports post-amputations, could not find support. There are many possible explanations for this, but most interesting might be the types of activities in which she engages. Competitive snowboarding, skateboarding, and wakeboarding are considered alternative or extreme action sports, sports that traditionally fell outside the purview of organized athletics prior to about 1993.[10] "Extreme" describes the potential for danger and injury in the sports themselves and the environments in which they are practiced (e.g., snowboarding down a mountain), as well as in the performance of the sports. Not only challenging in physical ability, these sports often demand creativity in expression; athletes are not judged only on their speed or strength, but on their creations, interpretations, and executions of various stunts. Here, then, we could perhaps draw some parallels with the Web 2.0 model I addressed in chapter four, with emphases on participation, personalization, and, of course, adaptation. As noted above, Purdy, Gale, and Moore cite this individuality and creativity as part of the mission of AAS; they extend these aspects from being constitutive of the sports to being constitutive of the identities and experiences of their athletes. Their organizational ethos thus contextualizes "adaptive athletics" in a way different than (though not exclusionary of) its use in more traditional or recreational sports.

The employment of "adaptive," then, in Gale's explanation and the mission of the organization, as well as in practice by the athletes of AAS, resonates with my theoretical framework for understanding prosthetized bodies. As an adjective, it engages a rhetoric of power and agency significantly different from Mitchell's rhetoric of sameness; it works against an "erasure of difference," suggesting flexible and active engagements (individuality, creativity, independence, self-confidence) instead of negation and lack of ability. In practice,

as a verb, "adapt" enacts the malleability of intervolved bodies and technologies, of altering these intervolvements for different purposes and functions. If we return to Pistorius, we might see "adaptation" as a means of being "able by the abilities you have." "Adaptive" embodies the idea of Canguilhem's "inventors" remaking forms not to fit a prescribed and limited norm, but as function demands. Again, here, the norm is instead reconfigured as the malleable, intervolved body.

Medical Prosthetization

To Amputate or Not To Amputate…

> In his junior year of college, Tom was running a four-minute mile. But he was also speeding towards a decision that would change his life: one that would raise a series of medical, ethical and deeply personal questions: What would you give up for your family? Or for your health? And what would you risk to continue doing something you loved? How far would you go? (Mankiewicz)

Tom White's story, shared in an interview with *Dateline NBC* correspondent Josh Mankiewicz in February 2009, in some ways plays like a traditional narrative of overcoming disability: White is described as a "miracle runner" whose determination allowed him to overcome a traumatic accident and later an amputation in order to continue running and to lead a happy life. America watches, inspired and heart-warmed, while the interviewer extols the man's bravery and strength. This kind of formulaic, media-friendly presentation of disability is problematic, and I address why at some length in chapter three. But I return to another such story here because White's is a bit different, offering an example of a changing

perception of the relationship between flesh and function and medical intervention. In the quote above, *Dateline* effectively, if dramatically, frames the issues at hand in this change, or more specifically the public perception of these issues, as ones of medicine, ethics, and "deeply personal questions." It is perhaps this aspect of the personal, of White's individual choices, that is most notable here.

As the introductory quote suggests, White was an avid and skilled runner up through his junior year of college. At twenty-one, while driving his motorcycle at night, he was hit by a drunk driver. His left foot was severely mangled, held to his leg only by his Achilles tendon. Upon arriving at the hospital, still conscious, White begged the doctor to save his foot, telling the doctor that he was a runner. The doctor saved the foot that night, though that was only the beginning of a number of painful procedures over the next year. For the next seven years, White did not run. However, after marrying an avid runner and hearing stories of her regular runs, he felt the inspiration once again. He retrained himself, slowly and painfully, until eventually he could return to racing. Though always uncomfortable, White learned to work through the pain, in the process regaining his old love—running.

Now, should the story stop here, it would indeed be inspiring. White's first choice was to preserve his flesh in order to preserve his running.[11] This was an interesting and challenging decision—presumably, had White's foot been amputated, he would have eventually regained good mobility and function with a prosthetic foot, but he may not have been able to run. His perception was that the prosthetic would be more disabling to his quality of life, which was deeply tied to running. Imperfect flesh made for the better bet. Though no simple task (for him or for his doctors), he eventually attained that quality.

Unfortunately, this didn't last forever, and by 2007, his running was mostly sidelined due to extreme pain in his foot.

Over twenty-five years after the accident, White had had a good run on his reattached foot, metaphorically and literally. At 47 years old, though, he was not ready to let running go. His foot was still functioning well enough in general: he was still able to walk and stand, and his foot presented no medical need for intervention. But White again wanted more than this basic functioning—he wanted to preserve his running-based quality of life. He had always known that amputation was an option; interestingly, as he began to seriously consider this route, the May 2007 issue of *Runner's World* ran a piece on Amy Palmiero-Winters, an accomplished marathoner who also has a single below-the-knee amputation.[12] Her story was remarkably similar to his: also an accomplished runner, she too suffered a severe foot injury as a result of a motorcycle accident (in 1993), though her foot was crushed, resulting in the loss of several bones and a barely-functioning ankle. She managed to run on the foot for a couple years prior to an amputation in 1997; in 2004, she began running on a prosthetic leg intended for walking, and in 2006, she finally obtained a running prosthetic, continuing to then run (and break records) in marathons and triathlons. Her story further confirmed White's inclinations—now, retaining his preserved foot would be more disabling to his quality of life. Now, prosthesis made for the better bet. Within a month, he had his leg amputated. Two months later, he received his first prosthesis, and within six months, he was starting to run again. In fall 2008, about ten months post-surgery, White received a cheetah-leg prosthetic, and competed in the New York City Marathon that November. At the end of the *Dateline* interview, Mankiewicz asks White what finishing the marathon proves. White responds,

"That I made the right decision. That I can [run a race] again, and it was fun. And no looking back."

This is an extremely truncated version of White's process, of one that is, for him, ultimately successful. But it is here, in his second choice of amputation, where we reach the site of the medical, ethical, personal questions raised above, the essence of which is simply this: is amputation appropriate when not medically necessary? White's success seemingly puts the issue to rest for *Dateline*, but that is not sufficient here. Thus the question, slightly restated, remains: to what extent ought one be allowed (medically, personally, ethically) to alter one's body, to surgically intervene and reconstruct flesh?

Of course, as I addressed in chapter four and in the first section here, cosmetic surgery offers a long history of such interventions. There, the purpose is generally to achieve a particular aesthetic norm, to make the body more "beautiful," and today, society is reasonably comfortable with these norming practices. While ethical and practical questions certainly remain, procedures like breast implants and tummy tucks are no longer anomalous, but seen as acceptable—even desirable—in popular culture. In White's situation, the choice of surgery is clearly not an issue of aesthetics. Here, the purpose is based on function, leaving an aesthetic result that is markedly different from the norms reinforced within cosmetic procedures.[13] Amputation clearly means removing a part of what we understand to be a "normal" or "whole" body—one with limbs and extremities that include two arms, two hands, two legs, and two feet. Divorced from the question of function and based solely on appearance, a body missing limbs, due to congenital defects or amputation, is considered anomalous. For White, the purpose of the subsequent prosthetic intervention would not be mimetic, but, again, functional, with a running limb that bears no resemblance to a fleshy

foot.[14] Such a procedure falls a bit outside cultural understandings of acceptable elective surgeries.

Traditionally, amputation has been considered an extreme solution, one undertaken only when, due to trauma or disease, preservation of the limb is not a viable option. In his *A History of Limb Amputation*, John Kirkup traces this explicitly through three chapters on "elective amputation," from "early evolution" to "recent times." The distinction "elective" here denotes not a patient's choice for surgery, but some degree of medical choice (e.g., in gangrene, where the choice lay between amputation and disease spreading throughout the body), as opposed to amputations from accidents, rituals, or punitive causes. Throughout these sections, Kirkup notes the relationship between medical developments (such as surgical techniques and tools, anesthesia, and antiseptics) and amputations; amputations became more medically acceptable as developments allowed for safer procedures with better patient outcomes. Prosthetic developments also influenced elective amputations, as better prosthetics equated to better quality of life for patients; however, amputation was generally seen as a last option.

This approach is still echoed in contemporary medical practice, though we can see reflections of the effects of such developments. In a section entitled "Limb Salvage versus Amputation," the 2007 edition of the medical textbook *Trauma* notes, "Although every appropriate effort should be made to preserve functional and anatomic integrity, for some severe lower extremity injuries, an amputation and prosthesis may be more effective for the patient than a limb that is still attached but is of limited use" (909). Here, the emphasis remains on retaining the limb when possible, but the options for intervention are greater, if a bit vague. The decision to amputate includes a determination of "functional…integrity,"

taking into consideration "effective[ness]" versus "limited use." The text goes on to consider other aspects of this decision process (presuming the patient is stable and the limb is potentially salvageable):

> Key factors…include the patient status, the level of potential amputation as well as the wishes of the patient in those cases in which they are cognizant. In all situations involving a decision between limb salvage and amputation, the two primary concerns are (a) the systemic consequences of either alternative for the patient and (b) the likelihood of achieving a functional limb versus the problems associated with limb salvage (time involved, duration of disability, medical risks, socioeconomic costs, number of operations, and hospitalizations, etc.). (909)

Again, here, many criteria remain open to interpretation, with "systemic consequences" and "functional" outcomes dependent not only upon the individual patient's medical status, but on the full spectrum of his or her life. This extends far beyond the comparatively simple distinctions of life or death; here, the question becomes "what *kind* of life?" Using this as a frame, we can see various interpretations of these vague or broad meanings in White's experiences.[15] Cognizant when initially injured, White clearly exercised his ability to express his wishes. At that time, his perception of the negative consequences of amputation outweighed any potential problems of limb salvage. Preservation and "anatomic integrity" equaled running, or "functional integrity;" amputation and prosthesis was not "more effective." Twenty-five years later, the tables turn: "functional integrity" trumps "anatomic integrity," due not only to the "limited use" of the salvaged limb, but to the development of (running) prostheses that are "more effective."

Within a medical realm, then, White's decision makes sense, and demonstrates an enactment of the fourth move of my historicized scaffolding—the effect of advancements in prosthetic technologies. Due in part to what was prosthetically available, White's willingness to alter his body in order to maintain (or even gain) function changed over time. But "simply" altering the body for function is not the whole of the story; if it were, we could have returned to Pistorius' story, which offers another version of this. There, his parents had to choose between Pistorius likely spending his life in a wheelchair, or having amputations and using prosthetics—again, questions of quality of life and function. But there seems a difference between this and White's scenario. First, because of his medical condition (bilateral hemimelia), without medical intervention, Pistorius did not have the choice of standing or walking on his legs, never mind of running; White had greater options here. Second, Pistorius' parents made their decision when he was under a year old. This highlights two further differences: (a) his parents had to consider Pistorius' entire future, not only one specific activity or length of time; and (b) children are far more adaptable than adults, physically and psychologically, and thus can "take" to a prosthetic more readily. While the first difference is notable—we might argue that Pistorius' case more obviously demonstrates "functional integrity" outweighing "anatomic integrity"—the consideration for individual experience built into this medical frame allows for both cases to validly stand. The second difference seems more culturally or socially substantial, moving further into how we see the malleable body *as* prosthetic.

My analysis of amputation and prosthetics in the medical realm has here operated primarily through logos, suggesting that "quality of life" or "function" are categories on a kind of "whether or not to amputate" check-list. Even though I acknowledge them as broad

or interpretable categories, this still suggests a very utilitarian approach.[16] But the possibility of amputation historically carries great cultural and emotional weight. Bruce Barcott, in an article in *Runner's World* chronically White's journey, articulates the emotional struggle historically associated with amputation:

> As a medical procedure, amputation goes back 2,500 years, but the human fear of limb loss hearkens back even further, to something primal. It's a horror-movie cliche and for good reason. The psychological toll—the self ripped apart, the disfigurement, the revulsion in the eyes of others—arguably dwarfs the pain. Amputation has always been an act forced upon a body. It's the last resort, the corner where gangrene traps the limb. (2)

Now, one can easily argue that this is not the most sensitive description of potential amputation, especially from a disability studies' perspective. It demonstrates a fearful view of body dis-integration, based on a belief in the sanctity of the (whole, unscarred) flesh, of an idealized normal body, of an able body. This is precisely the story of the natural body addressed above—the model that disability studies works to dismantle. It is a model that prosthetized bodies could be seen as recreating—the docile body, disciplined for "normal" function—and that I deconstruct in chapter three. It also is a model that I have suggested we are beginning to move away from with the construction of prosthetized bodies. Barcott's invocation of this fear suggests the continued pull of the myth of the "natural" body. Here, then, lies the second difference (2a) between Pistorius and White. Pistorius' parents might be accused of succumbing to this model in deciding to amputate his legs; perhaps they were influenced by a cultural acceptance of the so-called medical model of disability, one where disability is a physical problem that always has negative effects on quality of life, causing

disadvantages for the individual with the disability. As a parent, the desire for your child to have a "normal" life, to not be mocked or ostracized for being different, is powerful; whether right or wrong, one can certainly understand the emotional drive to try to protect a child from that, even through surgical intervention. This is speculation on the Pistorius' desires, of course, but I recognize that the emotional power of this, this disciplinary, modern power (to again invoke Foucault) could be the root of such a decision.

On the other hand, I see White demonstrating the inverse of this. He does not seem to be motivated by a desire for normalization on these terms, but by his personal desire to achieve a particular physical goal. He embodies a model of the body as a phenomenological somatechnic—where the fear of disintegration is made moot, replaced by a perception of the body as malleable, of the malleable body *as* prosthetic. Instead of amputation as a last resort, White embraces amputation as a means to adapt his body, to change his body's intervolvement with the world through prosthetic addition. However, the process of adaptation by an adult is quite different from that of Pistorius, who has only ever walked using prosthetics. In Barcott's lengthy article, we see White struggle through this adaptation; as Kurzman's example in chapter three showed, intervolvement of bodies and prosthetics is not immediate and complete, but an ever-evolving process. But White's response to his doctors' warnings of the difficult physical and psychological adjustments he would face post-amputation is telling: "Usually an amputation is a trauma,'" [White] said. 'But I went through that trauma 26 years ago'" (7). The lack of trauma in the decision to amputate suggests that for White, the idea of the sanctity of the flesh, of the prioritization of the "whole" body, has been destabilized. This malleability and adaptability of bodies is obviously reflected in the medical model for amputation as well, where consideration of the

whole person—not only medical need, but function, aesthetics, psychological effects—is factored into decisions for body modification. Definitions of ability and disability are here, too, complicated and blurred, stretching "normal" to include more individual, participatory interpretations. Following Canguilhem, White self-defines "normality" as including the ability to run marathons; this is not that of the average 47 year old, nor is it a model for a new normative ideal. Canguilhem's "normality" is explicitly individualized, and must be determined by the patient in the context of his or her own life. The long process of rehabilitation from amputation, and then adaptation to prosthetics, might not outweigh the difficulties encountered with a salvaged limb. Achieving more basic functions of standing and walking might be sufficiently normal for some in White's situation, while adapting to life without the use of a foot might satisfy, or perhaps simply not impede upon, the conditions of normality for others. The normativity for which I am arguing is not that of adapting the body to a specific level of function, ability, or appearance. It is this negotiation of individualized conceptions of "normality" that is itself a new norm, representative of the changing conception of the prosthetized body for which I've argued. However, at the same time it is a challenge to received conceptions of normality, which function not by indexing the norm to activity but instead to often oppressive social institutions and practices, as we have seen.

Targeting Reinnervation

Short of passing mention of running prostheses, I've not spent much time here discussing the material effects of technologically advanced prosthetics, which not only contribute to the potential appeal of prosthetization in these negotiations, but substantially alter the

intervolvements of prosthetics and the body. While there are many examples of these, including the cheetah running leg and the recently developed powered ankle-foot prosthetics from Hugh Herr, I want to turn here from legs to arms.[17] Due to factors like the complex actions required of hands and arms, developing highly effective functional prostheses for upper limbs is more challenging than for lower limbs. Until recently, myoelectric arms, first developed in the 1960s, were the most advanced limbs to date. These artificial limbs include motors that control the articulation of arms, hands, and fingers; the wearer, through voluntary muscle contractions, creates the impetus for the articulations.[18] Muscle contractions create small electronic signals that can be perceived through the skin. Myoelectric arms read these signals through electrodes attached to the skin's surface, and respond with the programmed action (e.g., rotating the arm at the elbow, or grasping with the hand). With this, the body is functionally rewritten in a way resonant with the rewriting of the somatosensory cortex discussed in chapter four. Users of these prosthetics retrain muscles in their residual limbs, shoulders, backs, or chests; they then create motion neurologically then muscularly, by thinking about that motion, stimulating contraction or release in specific muscles, and producing the electricity that is then translated into prosthetic motion. This creates a very literal intervolvement of bodies and technologies through the language of electric signaling, and a prosthetic that can be used more intuitively than non-electronic prosthetics, where motion is created by the user flipping switches or using pulleys. However, while these electronic prosthetics offer many advantages, they are far from perfect. In addition to problems of wear and breakdown (as is inevitable with any electronic device), operating these limbs is not actually as intuitive as it could be. Retraining muscles to perform these functions is in fact quite counterintuitive; though motion is generated by the user internally

(as opposed to externally manipulating the prosthetic), it requires good training and specific concentration and coordination, as each small muscle is responsible for one specific movement. A series of movements, like lifting and extending the arm, then grasping an object, demands that multiple muscles fire and release in specific order. Despite the potential of myoelectric limbs, Gerald Loeb notes their disappointments, as they "were (and continue to be) difficult to control, requiring intense user concentration to move one joint at a time with little or no control of velocity or force" (670). They have, however, laid groundwork for the next development: targeted muscle reinnervation (TMR).

Loeb's editorial comments on another significant publication in the 11 Feb 2009 issue of *JAMA*, Kuiken et al.'s "Targeted Muscle Reinnervation for Real-Time Myoelectric Control of Multifunction Artificial Arms." The article reports the development of TMR, a new surgical technique that improves patients' control over myoelectric prostheses. The technique is described as follows:

> With TMR, remaining arm nerves are transferred to the residual chest or upper-arm muscles that are no longer biomechanically functional due to loss of the limb. Once reinnervated, these muscles serve as biological amplifiers of motor commands from the transferred arm nerves and provide physiologically appropriate EMG signals for control of the elbow, wrist, and hand. (620)

Let's break this down a bit. After amputation, the nerves that controlled the now-amputated limb remain in the residual limb, but now lack function (due, again, to the amputation). In TMR, surgeons take relevant remaining nerves, such as the medial, radial and ulnar nerves (which control the lower arm, hand, and fingers) and transplant them to muscles closer to the body, such as in the chest wall or upper arm. Once these nerves are reinnervated, they can

then operate a myoelectric prosthetic arm similarly to before—through electric signals. The significant development, though, happens in this last step. In the prior myoelectric prosthetics, as we noted, and as Kuiken et al. explain, the operation of the limb "is not intuitive, because the residual muscles control physiologically unrelated movements"—the muscles must be retrained to do something new (620). In TMR, the signals for control are "physiologically appropriate"—in other words, the nerves are doing what the nerves have always done, only now they are located in a different area. Thus, the operation of the myoelectric prosthetic becomes far more intuitive, with "real-time control" (619). The researchers note that TRM "has markedly improved [patients'] functional use of prostheses," allowing patients to "intuitively and simultaneously control opening and closing of the hand as well as extension and flexion of the elbow" (620). The response of these prostheses using TRM, in time and in action (performing multiple movements without hesitation) far exceeds that of their predecessors, functioning with greater fluidity. This study only tests prototypes thus far, but the results are quite promising; immediate future plans include decreasing the size and weight and increasing the "robustness" of the prostheses, while long-term goals include increasing sensory feedback beyond simply visual feedback. Kuiken et al. state, "Improved sensory feedback, especially proprioception, will be critical to the long-term goal of neural integration and more natural control of complex prosthetic arms" (628).

The TRM technique represents a furthering of medical demonstrations of Merleau-Ponty's intervolvement, of understanding the body as highly malleable and adaptive. In chapter four, we saw this in the somatosensory remapping post-amputation; here, the remapping is quite literal, extending beyond the rewriting of prior myoelectric prostheses. In rewriting, the body is retrained to function with the prostheses; here, the body is

reconfigured, and the functioning with the prostheses happens at a neurological level very similar to that of the body and the original limb. Planned advances in proprioceptive awareness, knowledge of where the body is in space, along with added perceptions of sensations of temperature, pressure, and texture, creates deeper intervolvement between body and prosthesis.

In the medical realm, then, we can see the phenomenological somatechnic enacted in two related ways. On one hand, there is a greater willingness from both practitioners and patients to intervene upon the body beyond life and death scenarios. "Do no harm" does not inherently equate to "preserve the flesh," but instead considers the full spectrum of an individual's life and what gives that life quality. Tied intimately to this are advancements in prosthetics, the trajectory of which points to potential intervolvements so deeply entwined that they are functionally intuitive, fully neurologically integrated with our plastic, adaptive brains. These prostheses not only allow greater function than was historically possible, but that destabilize the priority of the "natural" body, reflecting back and revealing the malleable body as prosthetic. White's story demonstrates these medical enactments, again reflecting a participatory adaptation, a norm not defined by the medical community, but by White's own configuration of his quality of life, and his configuration of his body.

Adaptive Inventors

The relationships between bodies and prostheses are in some ways timeless. Their history extends to the beginnings of humans—their future, perhaps, to humans' end; they encompass realms from the most practical (medicine, communication) to the most theoretical and fantastical (language, science fiction). Understanding these relationships is inseparable from

questions about our very existence—what it means to live in the world, what it means to be "human." However, what I've argued throughout this work, following a particularly Foucauldian path, is that these relationships are not, cannot be singular and all-encompassing, but instead specific, historically, rhetorically, and culturally situated.

Through numerous examples and case studies, I have queried the prosthetized body in relation to (dis)ability, competition, medicine, popular culture, and norms, showing the limits and potentialities therein. In the case of Oscar Pistorius, we saw that, despite our general cultural enthusiasm for medical and technological developments, questions of what is "fair," what is "enhanced," of what is "normal" intrude and disrupt. Conceptions of a "natural" (i.e., "naturally correct") body as one separate from technologies reemerge in the face of change, but also reveal themselves as insufficient and arbitrary. In the cases of Mills, Reinertsen, and Darling, we explored another anxiety: the potential for prosthetization to produce docile bodies, fixed to a different norm. Instead of "purely natural" (and humanly flawed), this norm represents a disciplined perfection, bodies not only trained to function as machines, but replaced with mechanistic, controllable parts. Again, though, through examples of lived experiences with prosthetics (Kurzman, Sobchack), as well as consideration of the effects of scientific rhetorics, this explanation proved insufficient.

In chapter four, I posit a new epistemology in response to these examples and anxieties. I interweave a Merleau-Pontian phenomenology, a Foucauldian historicity, and perspectives from feminist and disability studies (with a continued eye to scientific and medical rhetorics). What emerges is a malleability, shaped by the scaffolding of four moves, culminating in the prosthetized body as a historically-situated phenomenological somatechnic.

In this last chapter, we see ways that this epistemology is already enacted through broadening aesthetics, consideration of "adaptation," and medical practices influenced by individual choice. These examples reflect a bodily ethic of adaptability and individual autonomy that extends beyond past conceptions of (dis)ability. This is certainly not a flawless ethic; my examples of adapted bodies throughout this work—ones which could be constructed as disabled due to injury and amputation—are exceptionally abled and privileged in other ways. Notably, nearly all are athletes who are committed to (and capable of) maintaining particular levels and types of functionality, and who seem to have access to education, health care, and finances. Certainly many people who have medically necessary prosthetic interventions are not abled in the same ways, due to significant constraints in economics, health, physical ability, access, and/or culture. Additionally, the conception of "autonomy" in body modification raises many issues of medical ethics, not the least of which is determining who can—who is "capable" as well as who is allowed—to make decisions about such alterations. I recognize the limitations of my claims here, and reaffirm that my argument is not to exclude experiences, nor to limit bodily constructions.

My goals here are precisely the opposite: to expand our understanding of prosthetized bodies, of "normal" bodies, by revealing the limits of constructions like abled and disabled, of "fixing" versus "enhancing" the body. If we see the potentialities of the historically and situationally specific intervolvements of bodies and technologies, broad, vague claims like those of the IAAF rule become at the least unproductive, at the worst, incoherent and discriminatory. As we adapt our malleable bodies, so must we adapt our malleable norms and rules for dealing with these bodies, in aesthetics and athletics, in rhetorics and medicine, individually and societally. This is not a call for a technological imperative, but a reflection

of our renegotiations of intervolvements of bodies and worlds/technologies/prosthetics. If we are, as I claim, Canguilhemian "inventors on the road to new forms," we ought not uncritically reject or accept our inventions as inevitabilities, but consider, question, and challenge the frames and norms of our prosthetic configurations of bodies as phenomenological somatechnics. We must adapt.

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[1] TED stands for "Technology, Education, Design" and began in 1984 as an annual conference to share ideas from people who work in those fields. It has since expanded through their website (TED.com), which, among other things, makes TED talks and performances available for free to the public.

[2] This reflects in part the discussion in chapter three of the relationships and juxtapositions between the natural and the technological in Sarah Reinertsen's ads.

[3] It is blatantly obvious to note that artists engage in such questions of aesthetics, bodies, and adaptation. While a full exploration of this is important, entering into such a discussion at this point moves us away from the narrow focus. However, I want to note the importance of Stelarc and Orlan in this context. The French artist Orlan presents a far more thorough deconstruction of the aesthetics of beauty through projects like "The Reincarnation of Saint-ORLAN." In this performative work, Orlan began by collecting representations of mythological Greek goddesses, choosing them based not on particular images, but on their stories. By amalgamating their features, she created a computerized self-portrait; she then began undergoing plastic surgery procedures to "incarnate" this representation with her flesh. The result is a slightly unsettling hybridization, demonstrating quite literally how beauty is variously constructed. Her art here is not only her reconstructed face, but the process of the reconstruction; each procedure is performative, shaped around different literary, psychological, or philosophical texts, which she reads while being operated upon.

Orlan describes her work as "carnal art" and "the classical work of a classical self-portrait," claiming:

> My work is not intended to be against plastic surgery, but rather against the norms of beauty and the dictates of the dominant ideology which is becoming more and more deeply embedded in female…flesh….My work is a fight against, the innate, the inexorable, the programmed, nature, DNA…and God! (312, 314).

While Mullins' prosthetic intervolvements resulted from medical need, Orlan elects these prosthetizations, actively engaging the body as prosthetic and malleable not only as a potentiality, but as a necessity. She calls out the countless ways we "mutate"—through the speed of airplanes and cars, by storing our memories on computers, through psychologically-motivated reconstructive surgeries—to destabilize any attempts to prioritize a natural body, created seemingly independently by God or science (314). Orlan uses traditional constructions of beauty, particularly as enforced by men upon women, to confront those very constructions, thus working both with and against Mullins' perceptions of beauty. By mixing specific "beautiful" features into one unnaturally hybridized whole, she deconstructs beauty both conceptually and literally. This is analogous to the participatory nature of Web 2.0, though to a far greater extreme; Orlan first engages in the play of digital constructions, then inscribes that creation into her flesh, employing the surgeon's scalpel as classical self-portraitists

employed a paint brush. She presents a compelling example of adaptive prosthetic aesthetics that further reveals Mullins' valid but naïve sense of prosthetic potentialities.

Orlan's deconstructions of nature and bodies are strongly influenced by the work of Stelarc, another artist who uses his body as his canvas. Stelarc claims that the body is obsolete, taking a position resonant with that of Stiegler (discussed in chapter four). In the introduction to his website, Stelarc writes:

> Bodies are both Zombies and Cyborgs. We have never had a mind of our own and we often perform involuntarily conditioned and externally prompted. Ever since we evolved as hominids and developed bipedal locomotion, two limbs became manipulators and we constructed artifacts, instruments and machines. In other words we have always been coupled with technology. We have always been prosthetic bodies.[3]

I of course disagree with the ahistoricism of this position, as I lay out extensively in chapter three; nevertheless, we can read Stelarc's work within my historicized framework. Clearly, he (always) already understands the malleable body as prosthetic, but his work is still dependent upon contemporary technological developments. His recent "Ear on Arm" project is a particularly vivid demonstration of bodily malleability possible only because of such medical/prosthetic developments. In this work, Stelarc has "grown" an extra left ear on his left forearm by implanting a biocompatible scaffolding of the ear under the skin; this scaffolding, the Medpor implant, is "a porous, biocompatible polyethylene material" that becomes incorporated into the body as tissue grows around and through it. With this, Stelarc realizes his long-held intrigue in "engineering a soft prosthesis using [his] own skin," complicating the body as prosthetic, as the prosthetic becomes body. His next step in the project is to implant a microphone into the ear, allowing that ear to transmit and broadcast what it "hears" through a wireless connection to the Internet.

Stelarc clearly complicates basic understandings of function, in addition to aesthetics, and the purpose of this project is most certainly one of decompartmentalization: challenging traditional body structure, conceptualizing prosthesis, as he claims, "not…as a sign of lack but rather as a symptom of excess." Similar to Orlan, Stelarc's claim reflects Mullins' statement that prosthetics need not only represent replacement of loss, but he pushes this much further in adding parts (here, an extra ear) that are purely excess. Stelarc works to reconfigure the body literally and functionally in light of our current "technological and media terrain," (re)deploying it as part of a communicative circuit. Here again, we can see his work within my historicized frame in Web 2.0 technologies. As I addressed previously, Web 2.0 is a meta-web, where the Web is used as a platform to create other Web content; that content is notable for its reflection and creation of identity, and for its communicative functions. With the Ear on Arm, Stelarc essentially constructs a kind of Body 2.0, where the body is used as a platform to create excess body content. This ear is somewhat obscurely reflective or constructive of identity, perhaps reflecting the identity of the body as prosthetic, but its communicative function is far greater, both literally (as/when it begins to transmit sound) and theoretically (as it visually "speaks" this prosthetization).[3]

In these brief examples, we can see that Stelarc and Orlan not only do the kind of work Mullins' calls for, but far surpass decompartmentalization as she perceives it. While fully considering the implications of their work requires its own project, we can see how they challenge any aesthetics of a seemingly "whole" or "normal" body, demonstrating a variability in adaptive prosthetic aesthetics that extends beyond Mullins' sense of whimsical, poetic beauty. Here, aesthetics *is* function *is* form *is* adaptation without boundaries.

[4] From the video "Athletes Rock Adaptive Action Sports," found on YouTube: http://www.youtube.com/watch?v=AcFn1inRRt4

[5] Explained on the AAS website.

[6] The AAS website features seven "advocates," four of whom have interviews and/or biographical information that indicates that they have all had amputations as a result of traumatic accidents

[7] As I addressed earlier, Mullins could also be seen in this frame, as (presumably) can the other founders and participants of AAS.

[8] Rick Hanson, a Canadian paraplegic athlete and activist, articulates a similar argument in a 1990 interview, where he calls for a change of attitude within the disabled community:

> "An athlete with a disability should be singled out strictly for performance against a recognized standard," he says, "not for his or her spirit or courage or, for that matter, colour, or disability. To do that diffuses the issue. It makes us appear separate. We are not. We are athletes." (Robertson)

Hanson here calls for a shifting frame of identification, wherein he (and other athletes) can move away from what functions as an exclusionary label ("disability") towards one that better represents their experience ("athletes"). While working against the political employment of the term "disability," Hanson actually enacts the social-constructivist roots of the disability studies movement in arguing that within the realm of athletics, his "disability" is not disabling. Nearly twenty years later, Pistorius' experience demonstrates that Hanson's call has not been enacted.

[11] "Choice" is not precisely the right word—White made his desire known, and luckily had an extremely skilled physician who could reattach the nearly-severed foot.

[12] See the article "One Tough Mama" (25-26); the following details on Palmiero-Winters are from that article.

[13] Certainly function can also be tied in to some cosmetic surgery, and reconstructive surgery achieves both functional and aesthetic purposes; drawing lines between these types of procedures can be quite arbitrary.

[14] By "normal" I here mean only the expected anatomical norms—two legs, two arms, etc.—not whether or not those parts appear or function "normally."

[15] I want to be clear that this is my interpretation of White's story through the criteria discussed in *Trauma*; I have no information about the decisions of White's physicians in relation to this specific textbook.

[16] The field of medicine in general is often reproached for its utilitarian, de-personalized approach; however, I do not think this is always the case. Here, for instance, the medical model for amputation seems highly individualized and situational. It is my application in this specific instance that potentially reduces this.

[17] Herr's ankle prosthesis more directly mimics the action of the biological ankle, through propulsion and sensitivity to terrain (see the MIT Media Lab for further information).

[18] Individual finger articulation was first achieved in the i-Limb, produced by Touch Bionics and first available in 2007.

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